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HIGHWAYS AND PUBLIC WORKS

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MAY-JUNE
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May - June 1949

Nine Years

Nine Miles and Nine Million Dollars Make Bayshore Freeway

By E. J. CARTER, Assistant District Construction Engineer, District IV

THE CALIFORNIA Highway Commission on December 30, 1939, authorized necessary surveys for improving the Bayshore Highway south of San Francisco as a "divided road."

This action launched a campaign that, nine years and $9,000,000 later, has resulted in completion of a nine-mile section of six-lane divided Bayshore Freeway between South San Francisco and San Mateo.

Twelve contracts have been required to bring this section to its present state. Briefly, they have been as follows: One contract for grading and constructing road drains; three grading and paving contracts; one complete structure, two substructure and two superstructure contracts; one armor coat shoulder contract and two landscaping contracts.

Attractive Structures

In order to best describe the completed portion of the freeway, we shall view it as seen by a motorist as he travels north along the existing four-lane undivided highway toward San Francisco.

In San Mateo, some 35 miles from the beginning of Route 68 south of San Jose, the motorist approaches the start of the improved section; a block north is the Peninsular Avenue overpass, a gracefully curving bridge spanning the roadway on single column piers.

Directar of Public Warks C. H. Purcell an May 11th awarded ta Guy F. Atkinsan Company and Chas. L. Harney, Inc., San Francisca, a cantract for $2,819,378.90 far an additianal unit af the Bayshare Freeway in San Francisco.

The cantract calls for grading, surfacing, overhead structures and the installatian of traffic signal and highway lighting systems between Augusta Street and 25th Street in the City of San Francisca.

Entering now upon the full six-lane divided freeway, he notes the outer highway that serves Burlingame on the left, as he speeds toward another curved separation structure two miles ahead at Broadway, Burlingame. Passing beneath this structure he can see ahead to the Millbrae overcrossing with the two San Francisco Airport overcrossings curving toward each other in the distance.

As he drives beneath the airport overcrossing on a sweeping 4,000-foot radius curve to the right, the motorist now approaches what is perhaps the most interesting interchange of the trip—the San Bruno overcrossing. At this interchange the cross traffic is carried above the freeway on an overcrossing and all turning movements are made at grade. The left turns are made by means of a full cloverleaf which is completely enclosed by a diamond pattern designed to accommodate all right-turn movements.

Seven Bridges

After leaving the San Bruno overcrossing the motorist enters the city of South San Francisco and approaches Colma Creek and the South San Francisco Belt Railway, where seven separate bridges are required to provide creek crossings and grade separations.

Just beyond are the twin bridges that carry mainline traffic above Grand Avenue and seven Southern Pacific Railroad Company tracks. A pedestrian overpass at California Avenue and the vehicular overcrossing at Butler Avenue complete the separation

Pedestrian overpass in South San Francisco, showing 120-foot clear span across new Bayshare Freeway

Broodway overcrossing in Burlingame looking north. Old Boyshore Highwoy is on right

Butler Road overcrossing in South San Francisco. Pedestrian overcrossing in central section and Grand Avenue overcrossing in background

structures. About 1,700 feet north of Butler Avenue the freeway curves to the left to a temporary connection again with the old four-lane undivided Route 68. In the future this connection will be eliminated and the freeway will be continued through Sierra Point and across the open water of San Francisco Bay to its ultimate connection with present and future east bay bridges.

Accidents Reduced

Prior to construction of the grade separation at Grand Avenue, the local traffic from the South San Francisco industrial area was forced to compete with peak-hour train and vehicular traffic in crossing the old Bayshore. The delay was added to by the fact that intersection signals were of necessity set to favor the Bayshore traffic. The delay was often as much as forty-five minutes, and at quitting time in the industrial area the intersection was badly congested for as much as an hour and a quarter. The twin bridges now carry express freeway traffic above the local traffic, thus permitting normal signal operation on Grand Avenue, which has resulted in the elimination of undue delay.

The efficacy of the freeway design with grade separations at all crossovers is attested to by the fact that since this section was opened to traffic the reported accidents have been reduced by 75 percent. In addition, it is estimated that the driving time from State Street in San Mateo to the temporary conform north of Butler Avenue in South San Francisco has been reduced by as much as twenty minutes during peak-hour periods.

Less Traveling Time

The decrease in traveling time is extremely significant when compared with the increase in traffic. In 1940, at the Broadway, Burlingame, traffic count station the average 24-hour traffic was 21,200 vehicles and in 1948 it was 29,700. This is an increase of 8,500 or 40 percent. The predicted traffic in 1970 is estimated at 47,300 vehicles—an increase of 126 percent over the 1940 total.

In general, the freeway consists of three 12-foot traffic lanes on either side of a 36-foot dividing strip.

The structural details of the traveled way vary as follows: 2.2 miles, Broadway to State Street, eight inches of portland cement concrete pavement on four inches of crusher run base and one foot minimum imported borrow; 5.2 miles, Colma Creek to Broadway, four inches of asphalt concrete on eight inches of crusher run base and two feet minimum imported borrow; 2.1 miles, South San Francisco to Colma Creek, eight inches of portland cement concrete pavement on four inches of crusher run base and eight inches minimum imported borrow.

Most Recent Project

Contract 04TC42-F, completed in May, is the most recent major contract on this section of the Bayshore

... Continued on page 58

This photo shows traffic congestion which existed on old Bayshore Highway at Butler Road in South San Francisco

Looking north on the new Boyshore Freeway toward Sierra Point. Hunter's Point in distance

Bayshore Freeway

Continued from page 4 . . .

Freeway. The Guy F. Atkinson Company was low bidder and was awarded the contract on September 10, 1947. This is the second contract on this section of the freeway to be built by this contractor. The company was the successful bidder on a two and one-quarter mile portion from State Street in San Mateo to Broadway, Burlingame. That project was completed in November, 1947, at an approximate cost of $700,000.

The major problem on this project, which traverses the marginal lands of San Francisco Bay, was the very high-water table, about 13-foot elevation. Indicative of the difficulty to be encountered was the half-mile stretch immediately south of the Southern Pacific Railroad in South San Francisco. Under a prior contract completed in March, 1947, this area was stabilized by means of vertical sand drains and an overlying sand blanket. An overload was placed and left for later removal.

Excavation in Mud

During excavation, mud was encountered having moisture content varying from 25 percent to 204 percent. The saturated unsuitable material was removed to depths as great as 15 feet in order to obtain subbearing soils having a moisture content of 20 percent or lower. These unsuitable material excavations were backfilled with imported rock base of the following grading: 18-inch maximum; not more than 50 percent passing a four-inch screen and not more than 20 percent passing the No. 4 mesh screen. From 2 to 10 feet of this material was placed, and the areas were then brought to grade with selected material for roadway excavation.

One of the major items was the portland cement concrete pavement. This pavement was constructed in 12-foot x 8-inch lanes, with premolded asphalt impregnated paper weakened plane joints and no expansion joints except at bridge paving notches, in conformance with current practice.

Neither the contractor nor the resident engineer was satisfied with his previous experiences with the paper weakened plane joints and, together, they evolved a modified placing procedure to overcome the tendency for dips at the joint and the tendency toward wavy joints.

Joint Problems

The changes were few and simple, but provided vastly superior results. The principal change was to add an ejector device to the placing iron to eject the paper strip when in proper position. This prevented any tendency for the joint to rise when the iron was withdrawn and the even pressure on both sides of the strip as the strip was ejected and the setting iron withdrawn acted to maintain a vertical and straight strip in its proper position, one-quarter inch below pavement grade.

Another change that contributed greatly to the smooth qualities of the joint was in finishing technique and consisted of simply adding sufficient low water content concrete taken from the mixer to either side of the joint, to force out the wetter material caused by the pounding and working of the notching iron. The concrete was added ahead of the final finishing machine and resulted in a smooth riding joint with uniform strength concrete on either side of the paper strip.

Two of the freeway structures, the Butler overcrossing and the pedestrian overcrossing, were constructed under this contract. The pedestrian overcrossing is unique, in that it has a clear span of 120 feet. This span required reinforcement as high as 230 pounds of steel per cubic yard of concrete in the span slab.

Major Items

Illustrating the vast requirements of modern freeway construction is the fact that the pavement placed for the 2.1 miles under Contract 04TC42-F, including necessary outer highways, would be sufficient to construct 7½ miles of the old standard pavement consisting of one 11-foot lane in each direction.

Following are the approximate quantities of the major items of work on this most recent contract:

Roadway excavation	233,000 cu. yds.
Structure excavation	10,000 cu. yds.
Overhaul	2,000,000 sta. yds.
Imported backfill material	29,000 tons
Imported base material	45,000 cu. yds.
Crusher run base	37,000 tons
Plant-mixed surfacing	14,250 tons
Cl. "B" PCC pavement	11,600 cu. yds.
Cl. "A" PCC structure concrete	1,300 cu. yds.
Reinforcing steel	235,000 lbs.
Structural steel	300,000 lbs.
R.C.P. (all sizes)	4,600 lin. ft.
C.M.P. (all sizes)	3,300 lin. ft.
Electrical conduit	5,800 lin. ft.
Sprinkling system (all sizes)	15,200 lin. ft.

This section of highway was opened to through main line traffic on January 28, 1949.

As previously stated, the Guy F. Atkinson Company of San Francisco was the contractor on Contract 04TC42-F. The work was done under the direction of Assistant State Highway Engineer Jno. H. Skeggs, Assistant District Engineer R. P. Duffy, District IV, with W. G. Remington, resident engineer, in direct charge of the work.

In Memoriam

ROY C. PAYNE

ROY C. PAYNE, Associate Highway Engineer, passed away in San Diego on March 4, 1949, after an illness lasting several months.

He was born on June 27, 1885, in Webster City, Iowa, and obtained his education in that city.

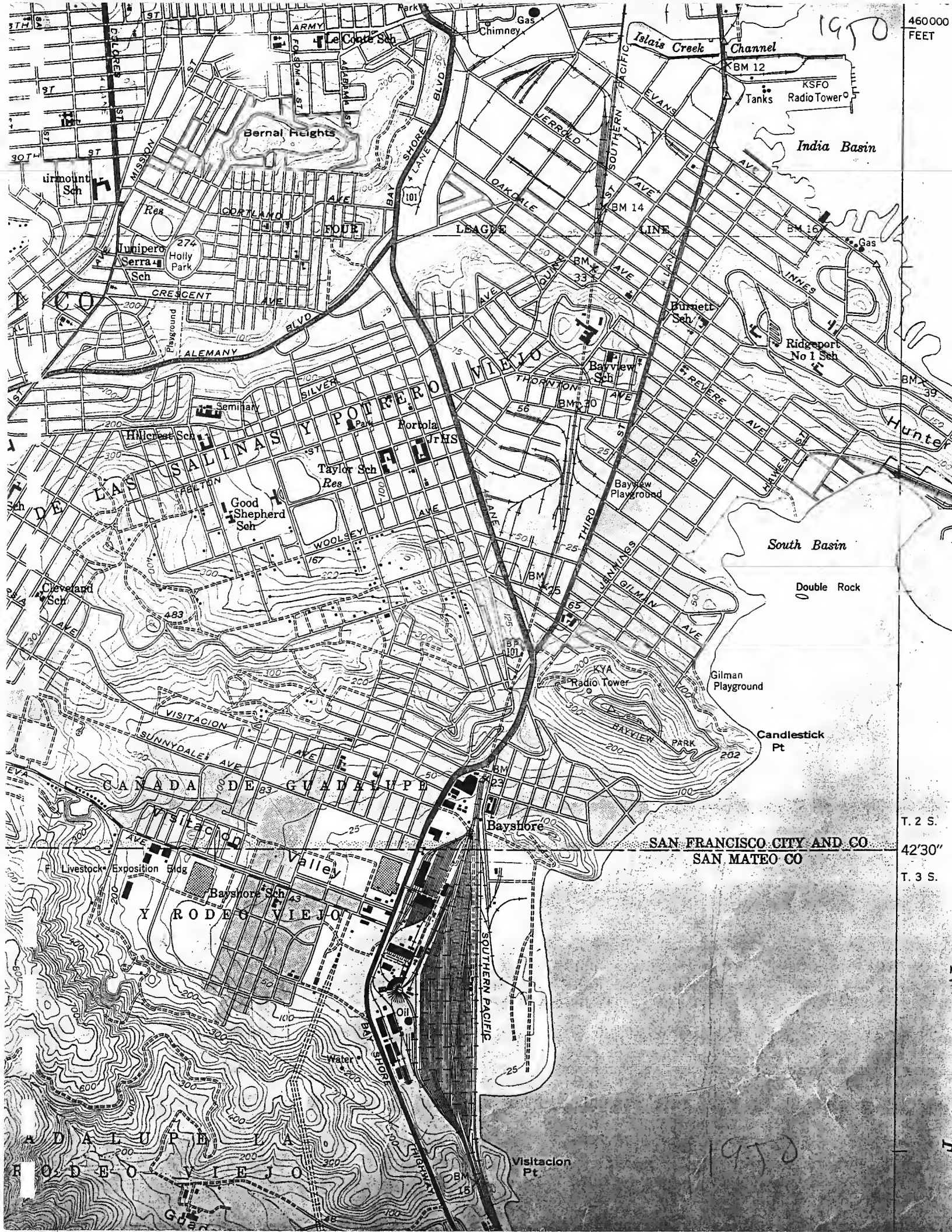
His early working days were spent in Seattle, Washington, as foreman and inspector for the Barber Asphalt Paving Company; far the City of Seattle; and for King County.

Mr. Payne was first employed by the Division of Highways as Assistant Resident Engineer in District VII an November 19, 1923. He was later transferred ta District VIII, where he was promoted to Associate Highway Engineer. He was assigned to District XI when it was first formed in 1933. His entire career in the division was spent on construction work, during which time he was resident engineer an many large highway prajects.

Mr. Payne is survived by his widow, Mrs. Mary D. Payne, and three daughters, Patricia A. Payne of San Diego, California; Mrs. Leslie M. Cash of Susanville, California; and Mrs. Walter F. Cleary of Riverside, California.

A host of friends and co-workers deeply regret his passing and extend their greatest sympathy.

Rincon Point
Key System Terminal
Rincon Hill
China Basin
Mission Rock
AT&SF Freight Yards
Central Basin
Potrero
Potrero Hill
Post Office
Civic Center
High School of Commerce
Girls HS
Lowell HS
Mission Dolores
Mission HS
Mission Park
Armory
Seals Stadium
Franklin Sq
Jackson Park
Crowley Playground
Buena Vista Park
Twin Peaks
Gompers Trade Sch
San Francisco Hospital
Mann Jr HS
SAN FRANCISCO
SAN MIGUEL
CHARTER LINE
2.2 MI. TO CALIF. 1 (19TH AVE.) FLEISHHACKER ZOO 4.1 MI.
(SAN FRANCISCO SOUTH)
2.1 MI. TO US 101
0.9 MI. TO US 101 BY-PASS
OALY CITY 4.9 MI
SOUTH SAN FRANCISCO
INTERNATIONAL AIRPORT
SCALE 1:24000
1 MILE
ROAD CLASSIFICATION
Heavy-duty
Improved dirt


1950
460000
FEET
Islais Creek Channel
BM 12
Tanks
KSFO
Radio Tower
India Basin
Le Conte Sch
Chimney
Gas
Bernal Heights
Fairmount Sch
Res
Junipero Serra Sch
Holly Park
274
CORTLAND AVE
FOUR LEAGUE LINE
BM 14
BM 16
Gas
CRESCENT AVE
ALEMANY BLVD
Playground
Burnett Sch
Ridgeport No 1 Sch
Bayview Sch
THORNTON AVE
REVERE AVE
Seminary
Hillcrest Sch
Portola Jr HS
Taylor Sch
Res
Good Shepherd Sch
WOOLSEY AVE
Bayview Playground
South Basin
Double Rock
Cleveland Sch
483
KYA
Radio Tower
Gilman Playground
BAYVIEW PARK
Candlestick Pt
VISITACION AVE
SUNNYDALE AVE
CAÑADA DE GUADALUPE
Visitacion Valley
Bayshore
T. 2 S.
SAN FRANCISCO CITY AND CO
SAN MATEO CO
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T. 3 S.
F. Livestock Exposition Bldg
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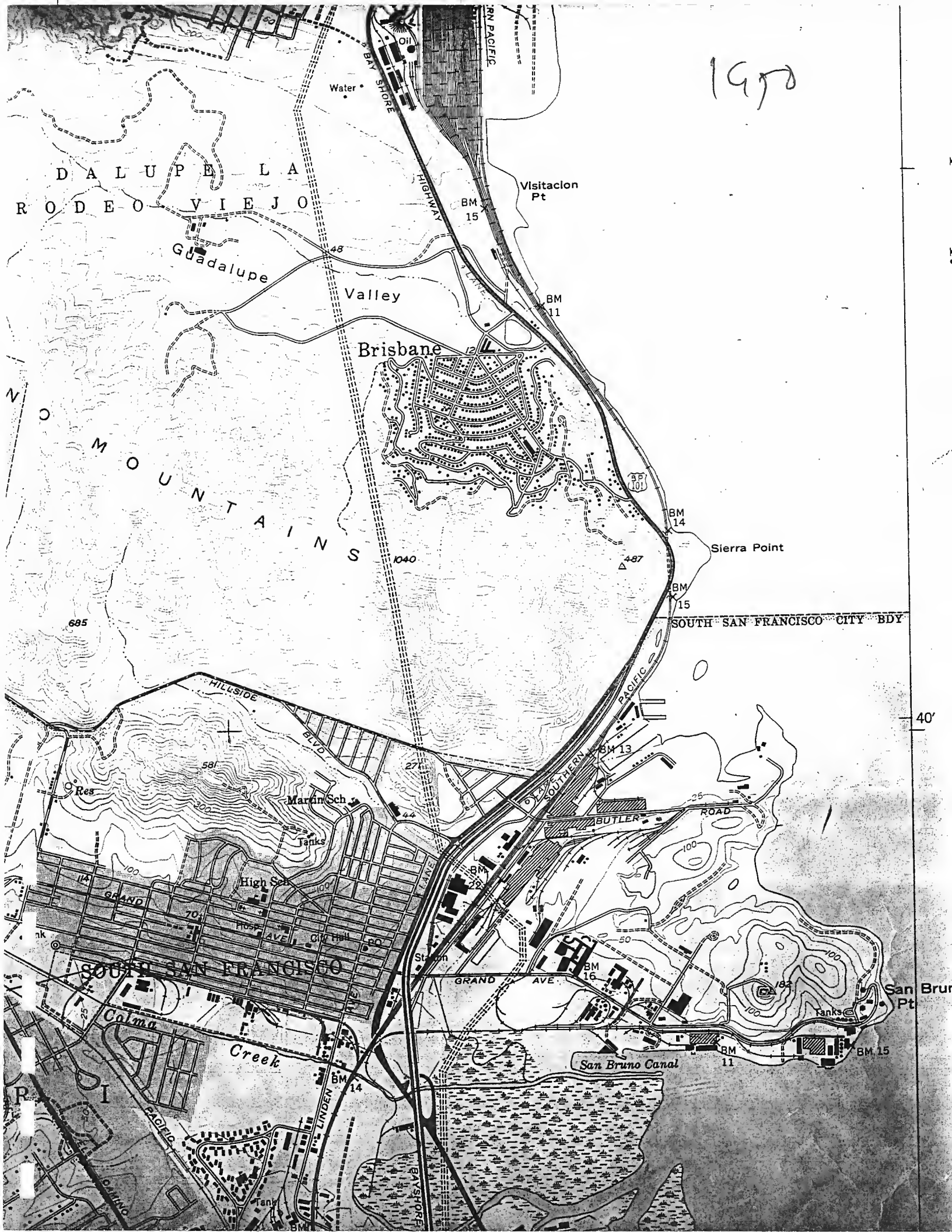
Y RODEO VIEJO
SOUTHERN PACIFIC
Oil
Water
BAY SHORE HIGHWAY
Visitacion Pt
1950


1950
Oil
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BAY SHORE HIGHWAY
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D A L U P E L A
R O D E O V I E J O
Guadalupe Valley
Visitacion Pt
BM 15
BM 11
Brisbane
BM 14
Sierra Point
BM 15
SOUTH SAN FRANCISCO CITY BDY
1040
487
685
HILLSIDE BLVD
PACIFIC
SOUTHERN
BM 13
BUTLER ROAD
Res
Martin Sch
Tanks
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GRAND AVE
City Hall
Post Office
Station
BM 22
BM 16
SOUTH SAN FRANCISCO
Colma Creek
San Bruno Canal
San Bruno Pt
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BM 14
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BAYSHORE
EL CAMINO
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Sierra Point
SOUTH SAN FRANCISCO CITY BDY
HILLSIDE BLVD
Martin Sch
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BUTLER ROAD
SOUTHERN PACIFIC
GRAND AVE
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Colma Creek
San Bruno Canal
LINDEN AVE
PACIFIC
BAYSHORE HIGHWAY
SAN MATEO AVE
Tank
TANFORAN RACE TRACK
CEMETERY
BELLE AIR RESERVATION
SOUTH SAN FRANCISCO CITY BOUNDARY
COAST GUARD RESERVATION
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SAN BRUNO
Station
City Hall
P.O.
SAN FRANCISCO INTERNATIONAL AIRPORT
1950
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SAN MATEO 7.3 MI
MILBRAE (MILBRAE AVE) 2 MI
SAN MATEO (3RD AVE) 6.4 MI
(SAN MATEO)
1 MILE
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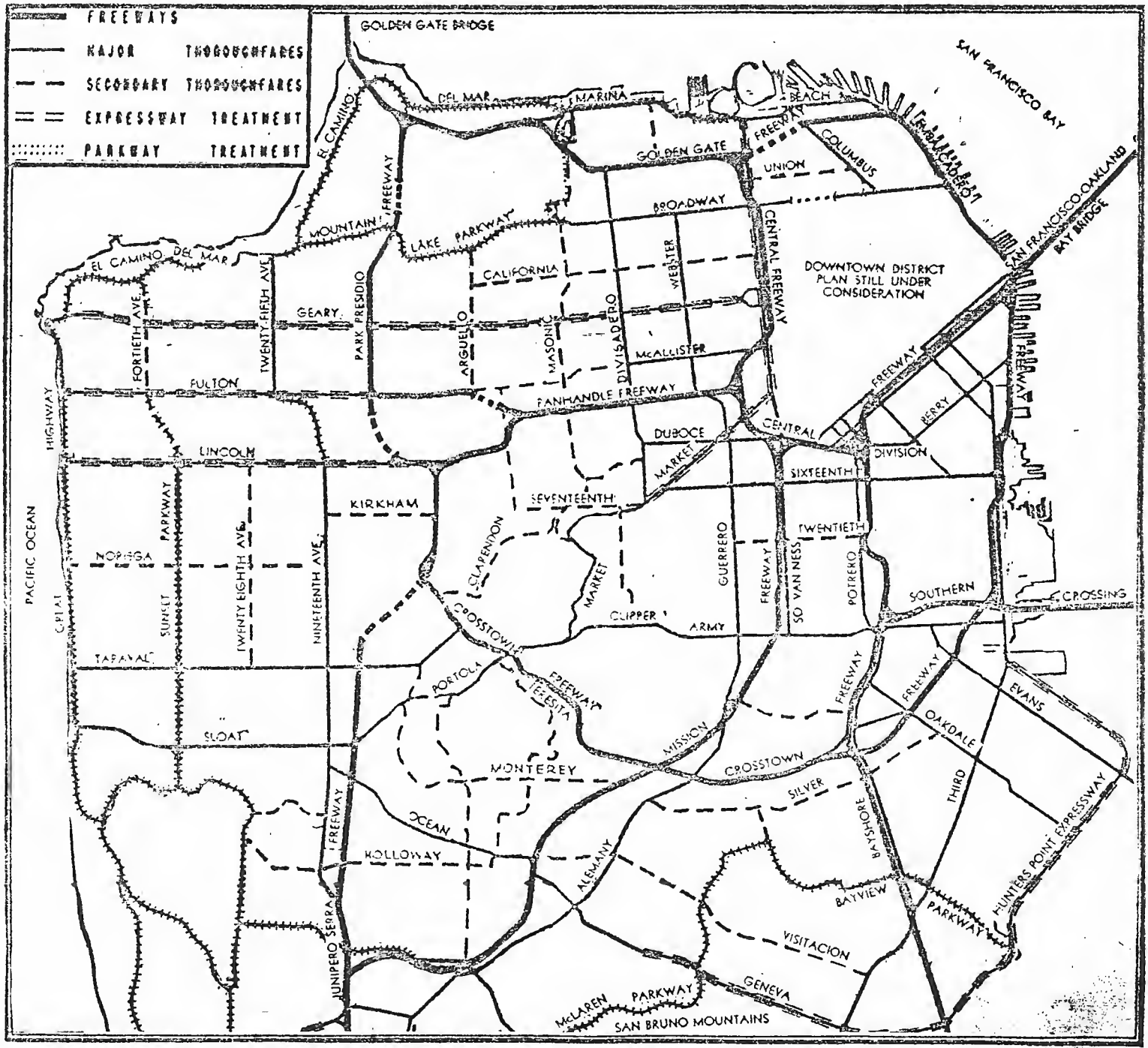
1 KILOMETER
ROAD CLASSIFICATION
HARD-SURFACE ALL WEATHER ROADS
DRY WEATHER ROADS
Heavy-duty
Medium-duty
4 LANE 6 LANE
Improved dirt
Unimproved dirt
Loose-surface, graded, or narrow hard-surface
U. S. Route
State Route

THE POLK TIMES

GULCH'S ONLY HOME-OWNED NEWSPAPER — A PINE PRESS PUBLICATION

PUBLISHED WEEKLY WITH OVER 12,000 READERS — 151 — Thursday, January 19, 1950



CENTRAL FREEWAY PROJECT is diagrammed here along with the other arteries in the City Planning Commission's proposed system of freeways. The plan envisages great freeways circling the entire northeastern portion of the city including the link to be known as the Central Freeway. It will directly affect Poly Gulch inasmuch as it leaps above Eddy between Polk and Van Ness and wends its way to Sacramento where it gradually dips into a depressed highway until it reaches Broadway. If you look at the upper righthand section you'll see what we mean. —Photo Courtesy S. F. Examiner

THE POLK TIMES
ULCH'S ONLY HOME-OWNED NEWSPAPER A PINE PRESS PUBLI
PUBLISHED WEEKLY WITH OVER 12,000 READERS
Vol III No. 1 151

FREEWAY BETWEEN VAN NESS AND POLK PROPOSED BY CITY

To Be Built in '55 From Eddy To Broadway

If the plans of the City Planning Commission come true, an entirely new look will come to the Polk-Van Ness shopping district in the year 1955 with the advent of the proposed Central Freeway cutting directly between Polk and Van Ness and linking the Marina with the downtown area. The map in the adjoining column shows in detail the contemplated Freeways Plan with the Central revealed extending its path from Eddy to Broadway.

More detailed blueprints reveal that this Freeway, which actually has its origin on 13th Street and South Van Ness, will hit the Polk area at Eddy in the form of a bridge over cross streets and continuing at a second-story level (a la the Bay Bridge approaches) until it reaches Sacramento, where it will become an underpass until it finally joins hands with Broadway. Connecting ramps with cross streets are scheduled to be built at O'Farrel, Post, Bush and Pine. And while most of the land and dwellings between Polk and Van Ness will be bought up, engineers envision this Freeway actually passing through some of the larger buildings.

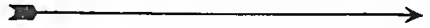
Even more amazing is the actual design of the Freeway itself. Envisioned are two decks of three lanes apiece on the bridge portion between Ellis and Sacramento where the entire Freeway will depress into one 6-lane underpass. The project will be built in sections according to financing plans with the construction period taking place between 1955 and 1965. Funds are expected to be raised from State gasoline taxes and the estimated cost to be below that of the Bayshore Freeway.

Purpose of the Freeway, besides effecting a speedy link between the Marina and downtown areas, is to relieve congestion on Polk St. by diverting "bypassing traffic" — that is, cars merely traveling through—and to relieve traffic hazards from cross streets for pedestrian shoppers. More, it will facilitate the use of side streets for off-street parking, which will tend to make shop-

(Continued on Page 2)

NEW UNIT OF BAYSHORE FREEWAY

Aerial photo of Boyshore Freeway project under construction and centerline projection through adjacent area. Solid line area now under contract; broken line area future location



THE MUCH discussed Metropolitan System of Freeways in San Francisco is now under way; the first unit covers a distance of one and a third miles between Augusta Street on the south where it conforms with the Bayshore Boulevard and terminates at Twenty-fifth Street on the north about three blocks east of Potrero Avenue. Both of these termini points make temporary connections to the existing highway.

The contract for this first unit was awarded to Guy F. Atkinson Company and Charles L. Harney, Inc., of South San Francisco and San Francisco, respectively, as a joint venture for $2,819,378.90 on May 11, 1949. The right of way cost of this section was approximately $3.000,000, making a total cost of about $6,000,000 for one and a third miles. The project is financed from state gas tax, federal aid and the San Francisco City and County apportionment of gas tax funds.

In planning this job, much study was made relative to the serious traffic problems. the number of going business establishments that would be affected by construction and the surface and underground utility obstructions. The work of removing factories and other buildings began more than two years before the advertisement of the contract and many of the utilities were relocated during this period.

The average week day automobile and truck traffic on this section of the Bayshore Boulevard is approximately 60,000 vehicles per day.

The traffic situation was made much more difficult by the bridge construction by the City of San Francisco at Islais Creek and Third Street, which closed one of the other main arteries for through traffic between San Francisco and the peninsula area, thereby greatly increasing the amount of traffic which had to be handled through construction.

Two Major Interchanges

There are two major interchanges included in the contract; one at the intersection of Alemany Boulevard and the Bayshore Highway and the other at the junction of Army Street and the Bayshore Highway. When this project is completed, the main line traffic will be carried above both of these intersections. with local city street traffic passing underneath. The main freeway will be an eight-lane divided highway. Alemany Boulevard is located on an area that at one time was part of the meandering Islais Creek and, as industries became established in this area, more and more of the delta land was filled up with refuse and at a later date a shallow crust of poor fill material was placed. It was necessary to remove large quantities of this unsatisfactory material prior to beginning construction of the various roadways for the planned rotary and piling to support the structures were driven to depths up to 100 feet. The rotary approach roadways will be paved with plant-mixed material on a cement treated base. The main line of the freeway will be paved with Portland cement concrete on a cement treated subgrade.

This contract is expected to be completed by the latter part of December, 1950. This work is all under the direction of Jno. H. Skeggs, Assistant State Highway Engineer, with headquarters in San Francisco. H. A. Simard is the Resident Engineer, and G. W. Thompson the Bridge Department representative.

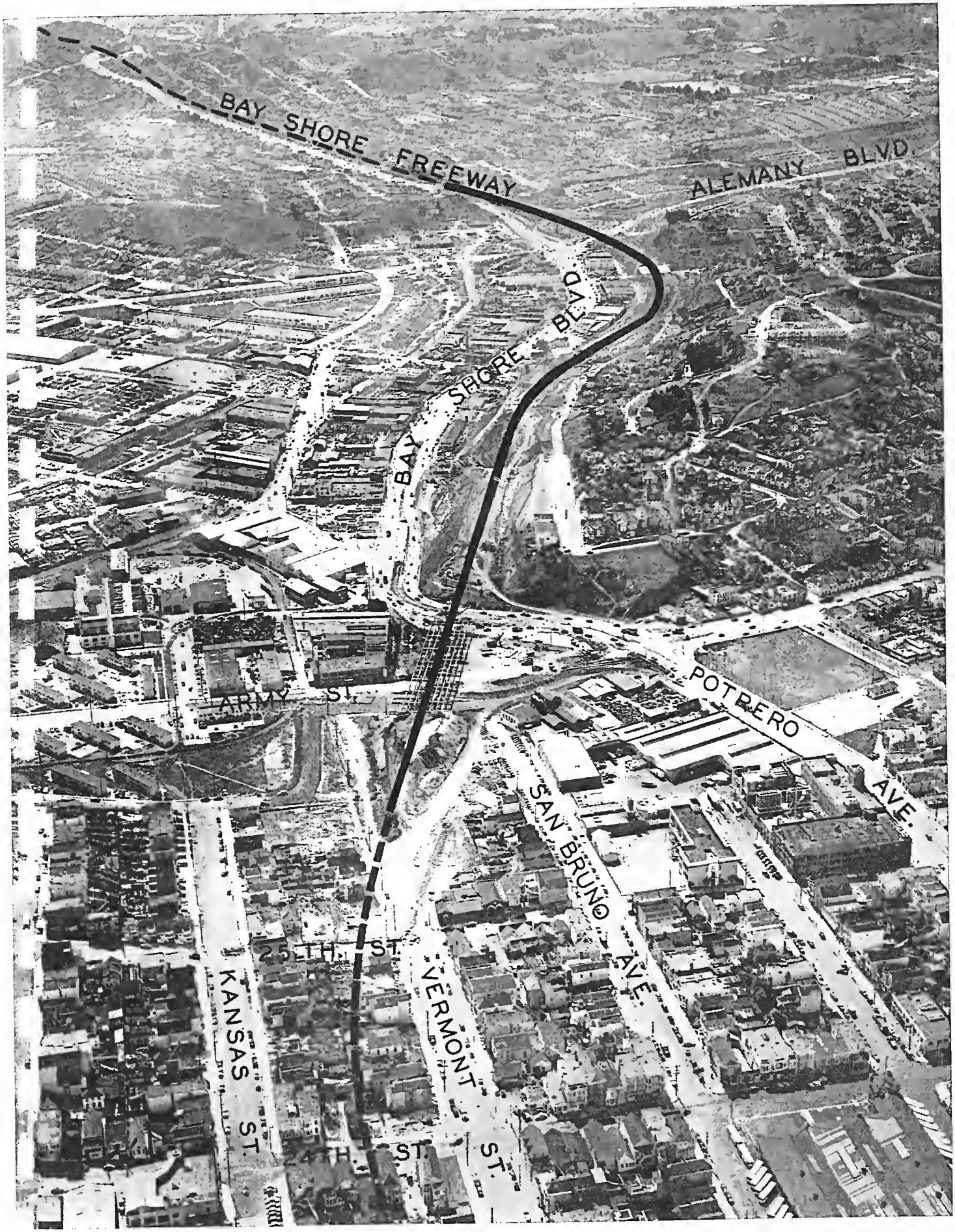
Heavy grading operations on Redlands-Beaumont highway project

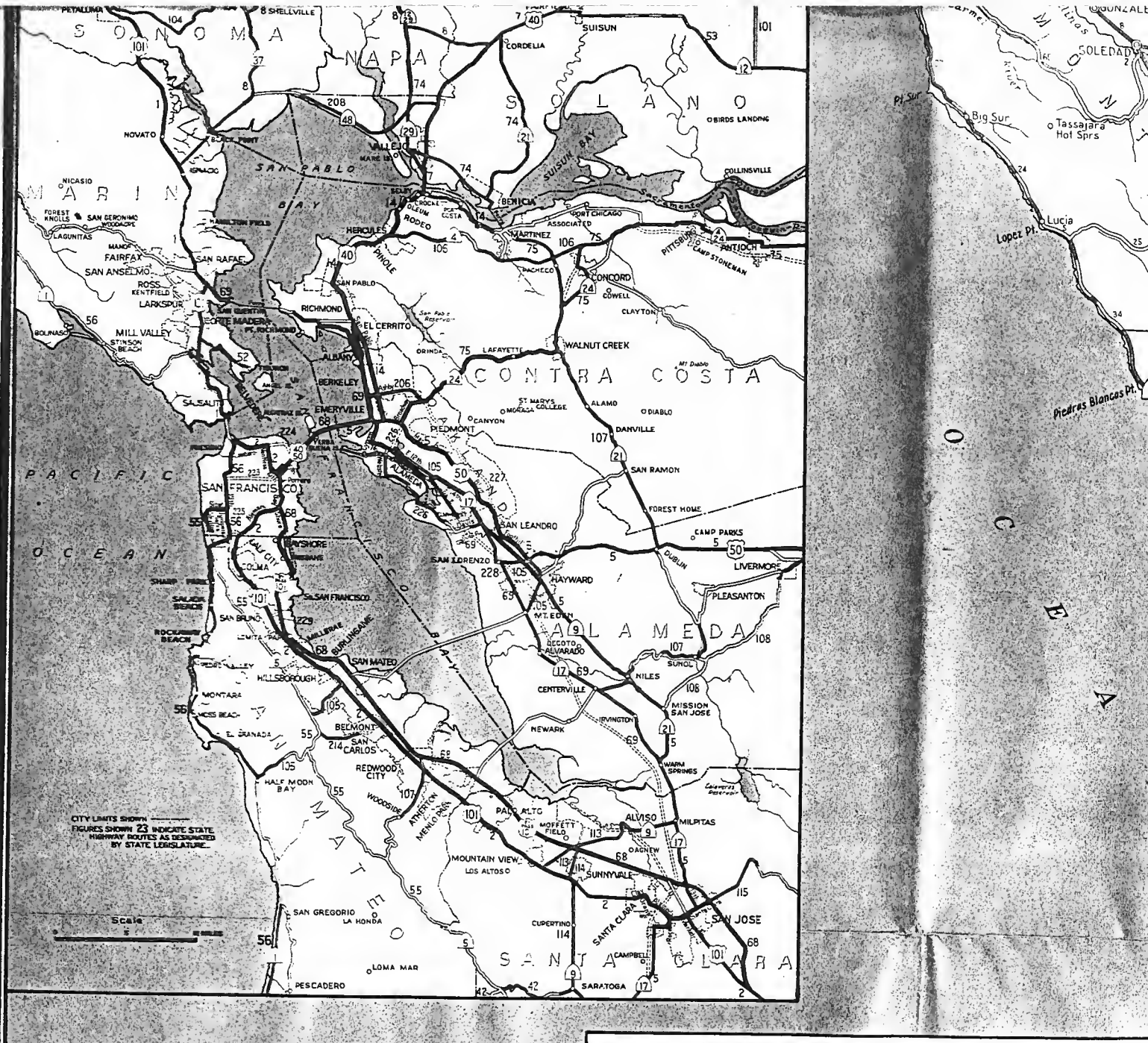
was worked out with the Counties of Riverside and San Bernardino and embodied in an agreement with the Riverside County Board of Supervisors, signed by Chairman Floyd E. Gilmore, and an agreement with the San Bernardino County Board of Supervisors, signed by Chairman Frank H. Mogle.

This highway is on the U. S. Federal Aid System and the current construction will be financed in part by federal aid. Mr. E. C. Brown, District Engineer of the Bureau of Public Roads, administers federal aid in California.

For the Division of Highways, E. A. Bannister is Resident Engineer and F. M. Morrill is Bridge Department Representative on the project.

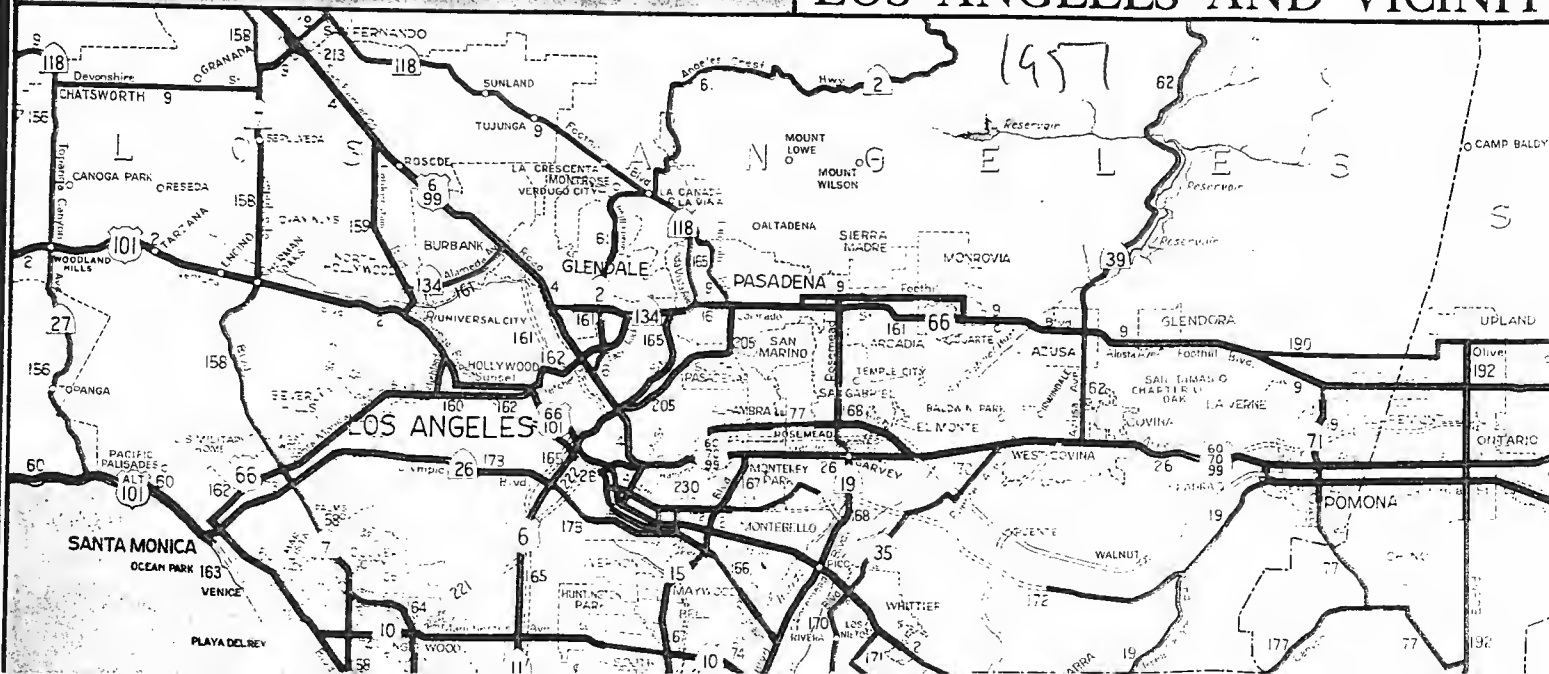
May - June 1950



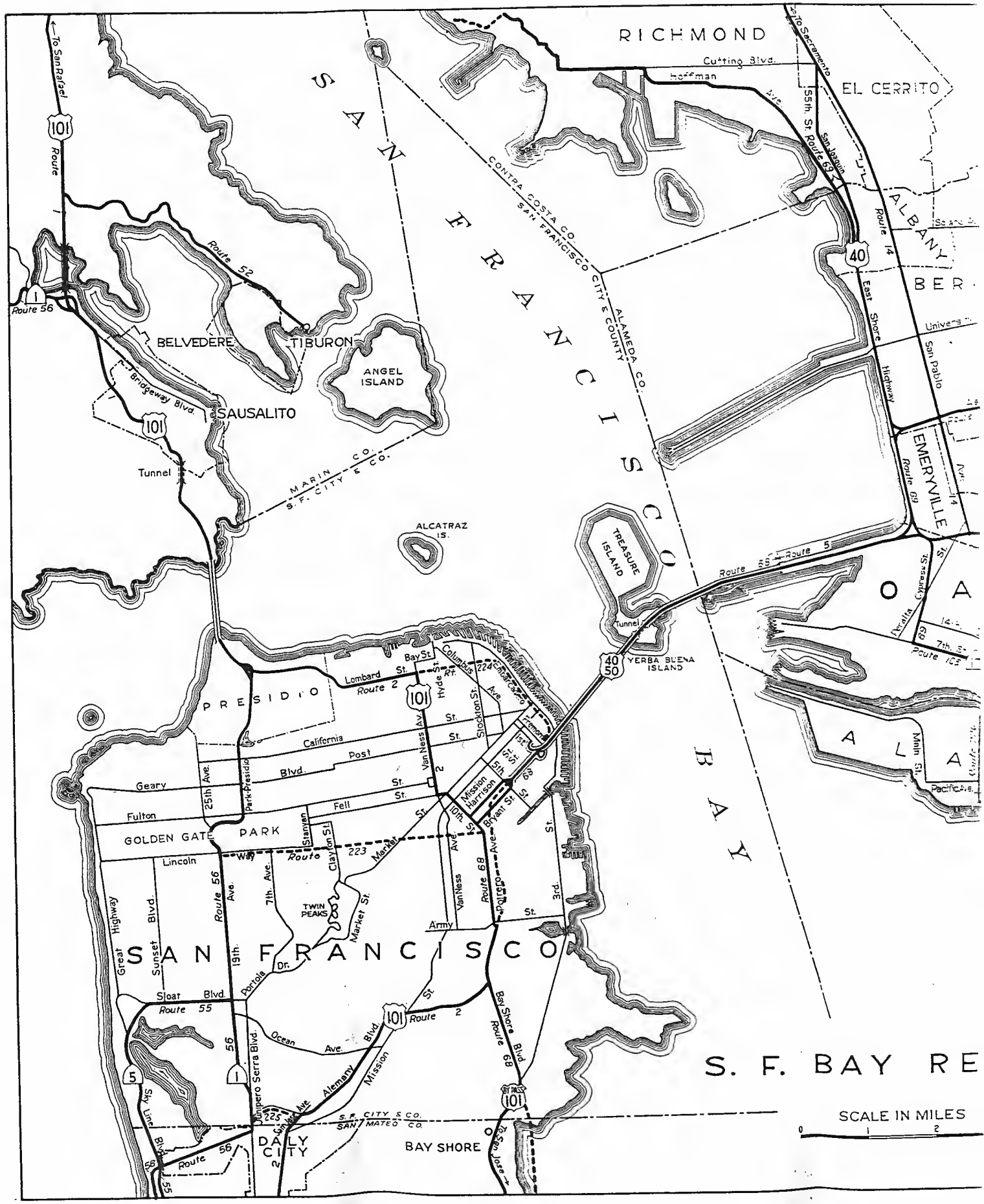


LOS ANGELES AND VICINIT

1957



1951



RICHMOND
Cutting Blvd.
Hoffman
Ave.
EL CERRITO
To Sacramento
55th. St. Route 69
San Joaquin
ALBANY
Route 14
BER
East Shore Highway
San Pablo
EMERYVILLE
Route 69
Cypress St.
Peralta
7th. St.
Route 103
Main St.
Pacific Ave.
O A
A L A
To San Rafael
Route 1
101
Route 56
Route 52
BELVEDERE
TIBURON
ANGEL ISLAND
Bridgeway Blvd.
SAUSALITO
Tunnel
MARIN CO.
S.F. CITY & CO.
SAN FRANCISCO
CONTRA COSTA CO.
SAN FRANCISCO CITY & COUNTY
ALAMEDA CO.
ALCATRAZ IS.
TREASURE ISLAND
Route 55
Route 5
Tunnel
YERBA BUENA ISLAND
40
50
Lombard St.
Route 2
Bay St.
Columbus Ave.
Hyde St.
Embarcadero
Fremont
PRESIDIO
California St.
Post St.
Geary Blvd.
Fulton St.
Fell St.
Park-Presidio
25th Ave.
GOLDEN GATE PARK
Lincoln Way
Route 223
Stanyan
Clayton St.
Market St.
Van Ness Av.
Stockton St.
Mission Harrison
Bryant St.
5th St.
10th St.
Route 68
Potrero Ave.
3rd. St.
Army St.
TWIN PEAKS
Market St.
Route 56
7th. Ave.
19th. Ave.
Great Highway
Sunset Blvd.
Portola Dr.
Sloat Blvd.
Route 55
Ocean Ave.
Alemany Blvd.
Mission St.
Bay Shore Blvd.
Route 68
Junipero Serra Blvd.
Sky Line Blvd.
Route 56
DALY CITY
S.F. CITY & CO.
SAN MATEO CO.
BAY SHORE
To San Jose
SAN FRANCISCO BAY
S. F. BAY RE
SCALE IN MILES
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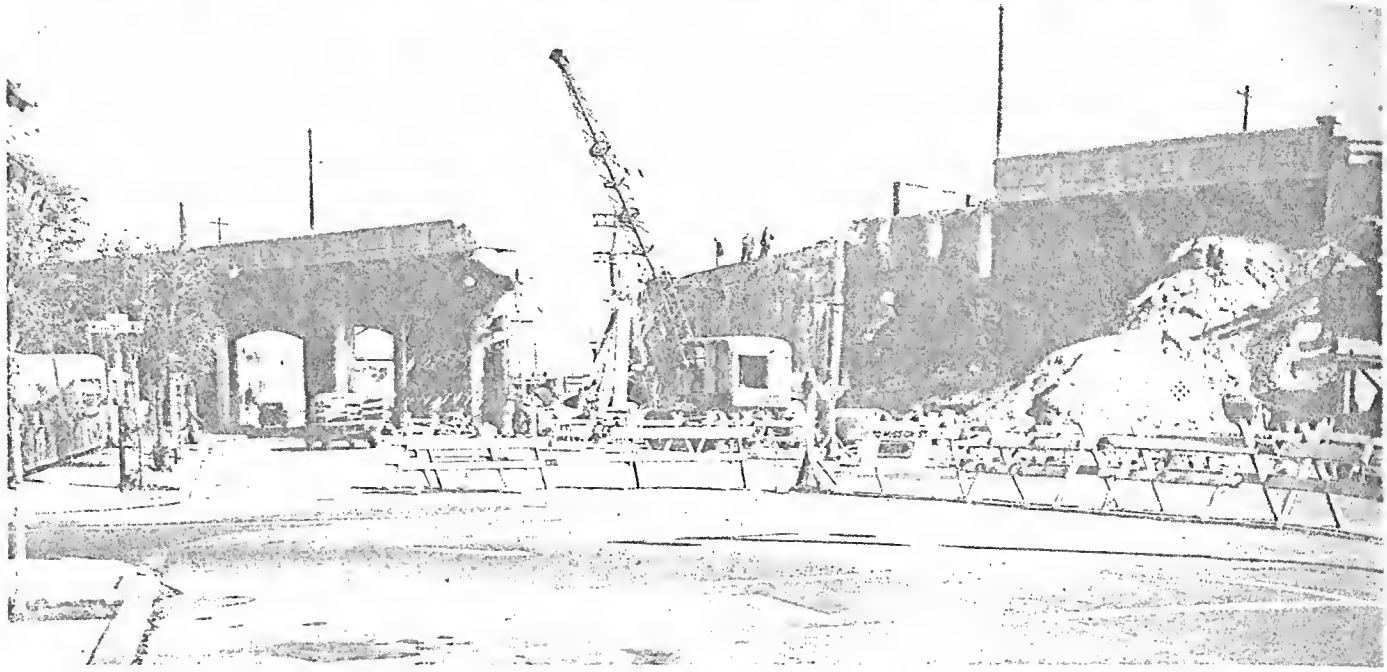
2

San Francisco Forward!



Demolishing Mission Street Viaduct over Alemany Boulevard. New structure will have only one pier in center strip of six-lane highway.

Modernizing San Francisco's Southwest Gateway

By RALPH G. WADSWORTH, City Engineer

JOINT ACTION OF STATE AND CITY FORCES will soon result in greatly improving one of the main gateways between San Francisco and San Mateo Counties. Several important contracts are under way and others will be undertaken during the current year, all directed to the development of Junipero Serra Boulevard as a major expressway. Other projects on San Jose Avenue and Mission Street will further contribute to the safety and comfort of motorists traveling between the two counties.

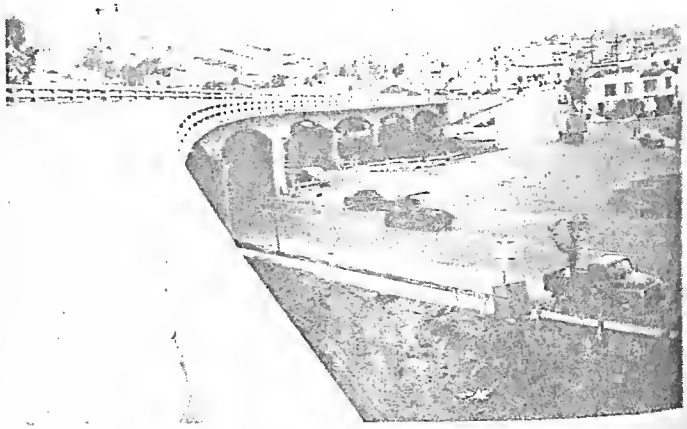
San Francisco County is separated from the Peninsula by an arbitrary east and west line located at the northerly base of the San Brouno mountains. This range extends westerly from the margin of the Bay a distance of about 3½ miles and rises to a maximum elevation of about 1,300 feet thereby effectively blocking vehicular or rail access across the county line for nearly two-thirds of the total width of the Peninsula.

The first highway, El Camino Real or San Jose Avenue, as well as the first railroad line entered San Francisco through what is now Daly City lying at the westerly extremity of the San Bruno range. After skirting the main ridge, both routes swung to the northeast and passed through the saddle dividing the Lake Merced and Islais Creek drainage area at the point where San Jose Avenue now intersects Alemany Boulevard. These early highway and railroad lines through the southwest gateway were the main arteries into San Francisco until the Bayshore Highway and the Southern Pacific's Bayshore cutoff were built in recent times around the easterly end of the San Bruno mountains.

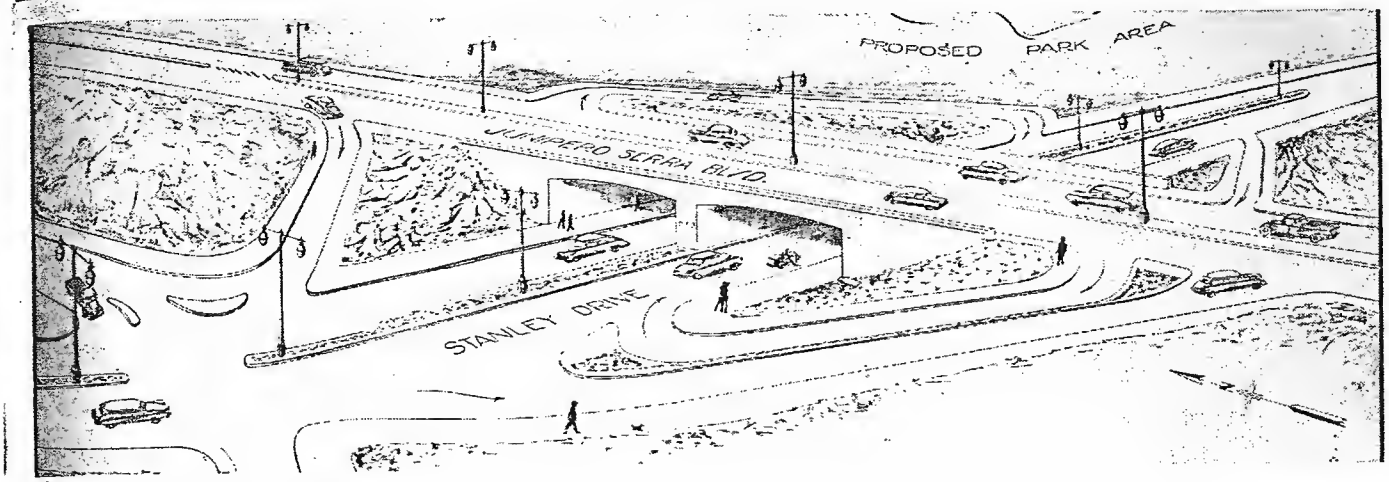
The capacity of the southwest gateway for motor vehicles was greatly augmented in the late twenties when Junipero Serra Boulevard was built on a line approximately due north and south through the westerly edge of Daly City. This highway was laid out with generous width and good grade and alignment. The portion in San Francisco was built by the Department of Public Works. It has been serving as an important traffic artery into the westerly portion of San Francisco for many years.

With the rapid growth of automobile use and traffic volumes which have taken place since the war, further development of Junipero Serra Boulevard has become imperative. The current improvements have to do principally with the provision of structures and dividing stripes to avoid conflicts between intersecting and opposing streams of traffic. The work in the present program includes the channelization and provision of signals north of the 19th Avenue intersections; an underpass at Stanley Drive with interchange roadways; an overpass for Alemany Boulevard westbound traffic; repaving of the existing roadway and provision of center islands south of Alemany Boulevard and extending into San Mateo County; and rearrangement of the intersection where Alemany Boulevard Extension runs westerly from Junipero Serra Boulevard to Skyline Boulevard.

The channelization work on Junipero Serra Boulevard has just been completed. The center island is fourteen feet wide in order to permit the construction of left turn havens at the principal cross streets. Traffic signals have been installed at the crossings of Winston Drive and Holloway Avenue.



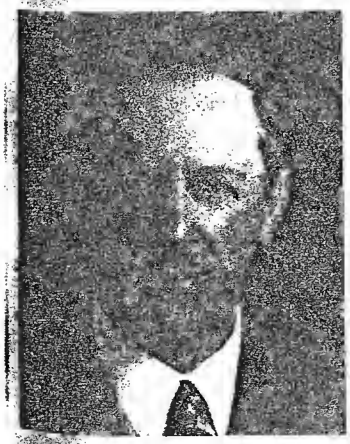
Alemany Overpass crossing Junipero Serra Boulevard.
(Looking northeast towards approach ramp.)



Stanley Drive Underpass with interchange roadways now under construction. Structure will permit traffic to pass directly through, giving direct connection from Alemany Boulevard to Lake Merced Boulevard.

Three phase signals have been provided at the 19th Avenue intersection.

The Stanley Drive underpass is covered by a contract recently awarded and work will be rapidly underway in the early summer. Not included in the contract is an extension of Stanley Drive easterly to a connection with Alemany Boulevard in the vicinity of Orizaba Avenue. Grading and paving of this part of Stanley Drive will be undertaken later in the year. The structure at Junipero Serra Boulevard will permit traffic to pass directly through, giving a direct connection from Alemany Boulevard to Lake Merced Boulevard. Loops and connecting ramps will be provided to permit any necessary turns to be made without traffic conflicts.



SHERMAN P. DUCKEL
Director
Department of Public Works
City and County of San Francisco

The Alemany Overpass was completed last year and opened to traffic just before Christmas. Westbound Alemany Boulevard traffic is carried overhead on a reinforced concrete viaduct built on a long sweeping curve to the left. The structure is 1,454 feet long and carries two lanes of traffic in one direction. The roadway width between curbs is 25 feet. A sidewalk five feet wide is provided on one side. The roadway alignment has a minimum radius of 600 feet and is super-elevated to compensate for the curvature. A distinctive feature of the structure is the use of colored concrete. The color was obtained by adding a certain quantity of blended iron oxides to the concrete materials during the mixing process. The resulting shade is a light terra cotta which harmonizes well with the reddish soil to be seen in the vicinity.

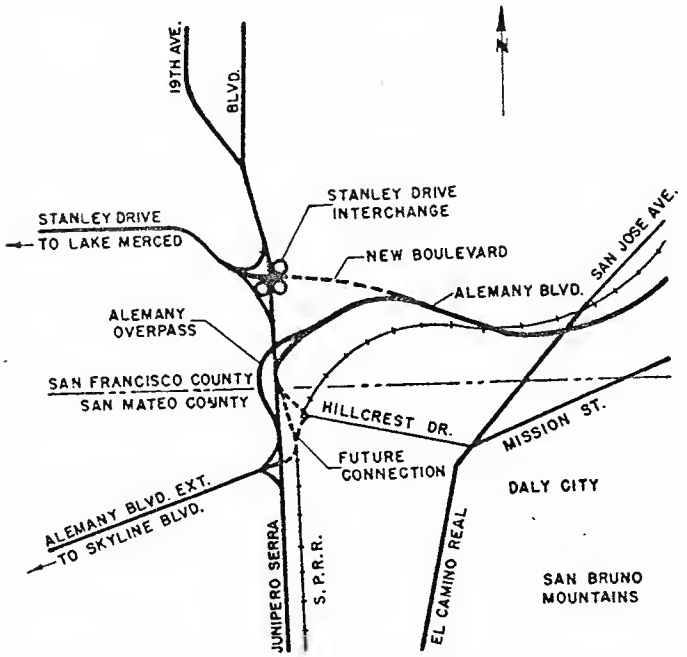
REPAVING UNDERTAKEN

Repaving of Junipero Serra Boulevard between Alemany Overpass and Alemany Boulevard Extension has been undertaken by the State Division of Highways under the same contract which provides for improvement of the intersection with the boulevard running to the west. This intersection will eventually be provided with a complete traffic interchange but the present improvement will merely include channelization and in the installation of modern traffic signals.

Farther to the south, and extending for a distance of 1.7 miles into San Mateo County, the pavement has been surfaced by Joint Highway District No. 10 which embraces San Francisco and San Mateo Counties. The district has also improved the signal system at the school street crossing.

ADDITIONAL WORK

Other work to be performed by City contract during the year will contribute to the improvement of arteries in the southwesterly portion of the City. These include principally reconstruction of the viaduct on Mission Street over Alemany Boulevard, the widening of San Jose Avenue through Bernal Cut, and the removal of the street car tracks from Mission Street as far south as the county line. When these contracts are completed, together with the work on the Junipero Serra Boulevard and Stanley Drive, the traffic arteries through the southwest gateway to the city will be in excellent shape to meet any emergency and to take care of traffic increases for many years to come.



Plan showing major Inter-County Highways through southwest Gateway.

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STOP SIGNS MEAN "STOP"

Too many drivers are guilty of sneaking through stop signs. Make it a habit to come to a full stop, cautions the California State Automobile Assn. This may prevent you from being involved in a serious collision.

The accident toll is highest between the hours of 3and 8 p.m. When you drive during this period be especially careful, warns the Calif. State Automobile Assn.

CALIFORNIA
HIGHWAYS AND PUBLIC WORKS

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MAY - JUNE
1951

May - June 1951

Bayshore Freeway

First Unit Within City of San Francisco Opened to Public Use

"T[illegible] YOUR USE and the use of the citizen[illegible]f this community and its environs and to the use of the visitors and guests here assembled, we dedicate this freeway. May it ever be used with pleasure, prc[illegible] and safety."

With these words, Highway Commissioner Chester H. Warlow of Fre[illegible]o. on Friday morning, June 1st, officially opened to traffic the first unit of the Bayshore Freeway within the Cit[illegible] of San Francisco. Warlow rep-

CHESTER H. WARLOW
State Highway Commissioner

re[illegible]ted Director of Public Works C. [illegible]. Purcell, Chairman of the California Highway Commission.

With Mayor Elmer E. Robinson and cit[illegible] and county officials of San Francis[illegible]o, engineers of the Division of Highways and U. S. Bureau of Public R[illegible]ds and several hundred interested sp[illegible]tators in attendance, dedicatory ceremonies were held at 25th and Vermont Streets. The project itself exte[illegible]s from Augusta Street to 25th St[illegible]et.

Other Units Scheduled

[illegible]arlow was the principal speaker at th[illegible] celebration which was arranged by the San Francisco Chamber of Commerce. President Lowrey of that organization introduced the speakers, among whom were State Highway Engineer George T. McCoy, Guy F. Atkinson, whose company was contractor on the project, as well as Mayor Robinson and Commissioner Warlow. Mayor Robinson cut a red ribbon stretched across the freeway, signaling its opening to public use.

McCoy expressed the hope that construction will start soon on two other units of the freeway, from 18th Street to Bryant Street and from Army to 17th Street. Future plans call for the construction of the freeway from San Francisco to San Jose, a distance of 33 miles.

First Unit in San Francisco

The project opened on June 1st is the first unit of the freeway completed in San Francisco. It is 1.3 miles in length, extends from Augusta Street on the south to 25th Street on the north, and was awarded to Guy F. Atkinson Co. and Chas. L. Harney, Inc., on May 11, 1949.

The construction cost was $3,450,000 and the cost of right of way, including clearing of improvements and utilities, was $3,400,000, or a total of $6,500,000.

The freeway consists of an eight-lane divided roadway, crossing over the city street network at the Army Street and Alemany Boulevard intersections, where street level traffic is distributed to and from the freeway by on and off ramps, and local street traffic is segregated and distributed through traffic circles at the street levels.

The structures over Army Street and Alemany Boulevard are structural steel bridges 643 feet and 758 feet in length.

The freeway crosses over Courtland Avenue on a reinforced concrete bridge 132 feet in length.

A pedestrian underpass crosses under the freeway at Faith Street, connecting Holladay Avenue on the west with Bayshore Boulevard on the east.

The structural design of the roadway is eight-inch Portland cement concrete pavement on one foot of imported borrow; the top four inches of which has been cement treated.

The traffic lanes are 12 feet wide, bordered at the shoulder line with rolled gutters and paved shoulders.

A six-foot minimum curbed division strip separates the lanes of opposing traffic.

The ramp connections are paved with plant mix surfacing for color contrast.

COL. JNO. H. SKEGGS
Assistant State Highway Engineer

Illumination is provided at all points of interchange and for lighting directional signs.

Traffic signals are installed at both ends of the freeway to control movement to and from city streets and make connection with old Bayshore Highway.

The construction of this unit consumed approximately two years and was financed from state highway, gas tax and federal aid funds.

In planning this project, which was constructed under the direction of Col. Jno. H. Skeggs, Assistant State Highway Engineer, with headquarters in San Francisco, extensive study was

made relative to the serious traffic problems, the number of going business establishments that would be affected by construction and the surface and underground utility obstructions. The work of removing factories and other buildings began more than two years before the advertisement of the contract and many of the utilities were relocated during this period.

Difficult Traffic System

The traffic situation was made much more difficult by the bridge construction by the City of San Francisco at Islais Creek and Third Street, which closed one of the other main arteries for through traffic between San Francisco and the peninsula area, thereby greatly increasing the amount of traffic which had to be handled through construction.

Alemany Boulevard is located on an area that at one time was part of the meandering Islais Creek and, as industries became established in this area, more and more of the delta land was filled up with refuse and at a later date a shallow crust of poor fill material was placed. It was necessary to remove large quantities of this unsatisfactory material prior to beginning construction of the various roadways for the planned rotary, and pilings to support the structures were driven to depths up to 100 feet.

Commissioner Warlow Speaks

Highway Commissioner Warlow said in part:

"I stand before you today doubly honored, honored in that I have been invited to address you on this auspicious occasion. Doubly so in that I am asked to speak in the place and stead and on behalf of that distinguished gentleman, Charles H. Purcell, Chairman of the California Highway Commission and Director of Public Works, who is unable to be with us today. Mr. Purcell has asked me to convey to you, and all of you, his greetings and best wishes. This I do with great personal pleasure.

"Charlie Purcell would have enjoyed being here today, for no man is more interested in, or concerned with the traffic problems and welfare of this community than he. He would have especially enjoyed this day, for it is the first occasion when this city and its civic organizations have publicly noted the importance of the California Freeway System now under construction, and joined in the festivities celebrating the completion of a major project on that system within its boundaries.

Aerial photograph of newly completed sectio Bayshore Freeway in San Francisco

Unique City

"San Francisco is a unique city city of history and hills, of fix boundaries and big bridges, of beau ful bays and lovely vistas. It is a ci where almost every foot of private owned land is occupied by a busine or residence structure; a city who only lateral expansion, paradoxical it may seem, will occur in the areas b yond its legal limits. It is a city wher almost one-fifth of its workers leave the place of their labors and daily retire to another community to spend the hours of their refreshment and repose.

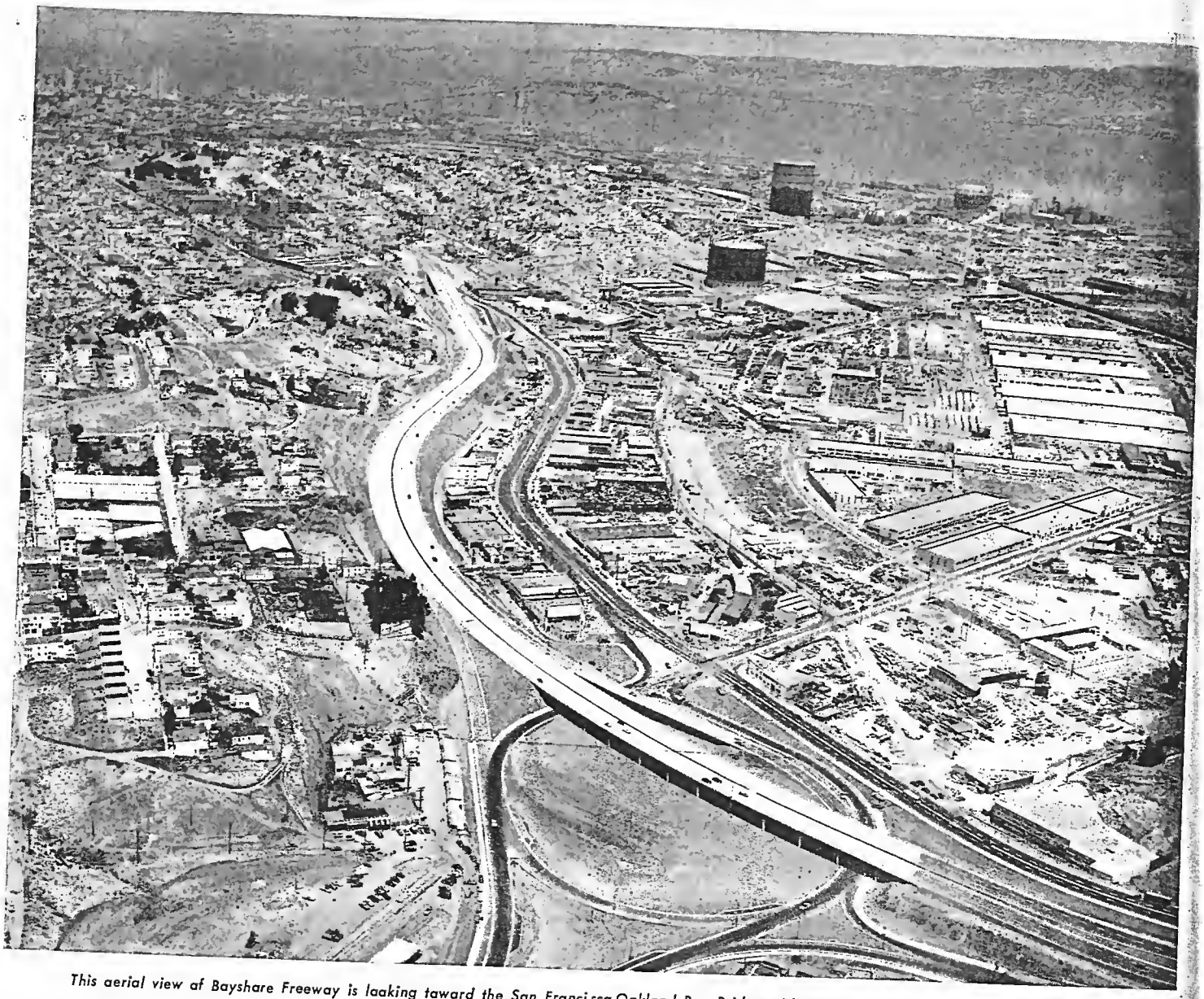
"Such a city has traffic problems, and as this city expands, building skyward as it must, those problems will become even more acute than they are now. We therefore must build not only for the present but for the future as well, that major operations, presently necessary, will not of necessity be repeated at an early date.

Colossal Job

"To provide transportation facilities for a major city is a colossal undertaking, and the highway part of that, the portion which falls to our lot, is

Mayor Elmer E. Robinson snips ribbon, officially opening new unit of Bayshore Freeway. LEFT TO RIGHT: Alon J. Lowrey, President, San Francisco Chamber of Commerce; Mayor Robinson, Highway Commissioner Chester H. Warlow; State Highway Engineer George T. McCoy, Highway Commissioner F. Wolter Sondelin.

ALEMANY BLVD.
SHORE
BAY
BLVD.
AVE.
MOLLADAY
MARIN
ST.
ARMY
ST.



This aerial view of Bayshare Freeway is laaking taward the San Franci sca-Oakland Bay Bridge with which the freeway ultimately will cannect

no mean job either physically, as you can see, or financially, as you shall hear.

"This day others will address their attention to the details of the physical and financial aspects of this particular project, whose completion we here note; but I choose to observe that though it is only 1.3 miles long, yet the right of way, the road bed, the structures and ramps, have cost a total of $6,500,000. And as we extend this freeway into the heart of the city, there is yet more to come, or should I say, more to go.

"I choose rather to direct your attention to the over-all state-wide picture of the highway problem and San Francisco's position in that picture.

Some Financial Facts

"Prior to 1947 the Department of Public Works was receiving for purchase of rights of way and for highway construction about $23,000,000 per year. Out of the Legislature during that session, with the aggressive backing of our Governor Earl Warren, came the Collier-Burns Highway Act of 1947. At that time the critical deficiencies on the State Highway System, measured in money, amounted to $1,700,000,000. During the first five years of operation under this law, there has been spent or allocated for spending this next fiscal year a total in excess of $460,000,000 for rights of way and new construction. Of this amount, more than $33,000,000 was assigned to San Francisco, and more than $111,000,000 was allotted to this highway district which is in charge of Colonel Jno. H. Skeggs, Assistant State Highway Engineer.

Millions Required

"This freeway, today open for traffic, is not an isolated section of state highway, but is an important project on the Bayshore Freeway leading from San Jose to San Francisco. It is but a part of a well-planned program of progressive construction on this state route, which is one of the major arteries of travel in California.

"Upon this over-all undertaking we have constructed, under construction, or budgeted for immediate construction in the first five-year period, a total of 16.4 miles at a cost of over $30,000,000. There yet remains an additional 33 miles of freeway

... Continued on page 39

Bayshore Freeway

...ntinued from page 4...

to be built between these two cities, and ...will require another $50,000,000 to complete it to modern freeway standards.

"A major undertaking—financially comparable to your magnificent Bay ...idge—a necessary undertaking! ...pon this highway traffic builds up from over 11,000 vehicles per day just ...orth of San Jose to more than 60,000 ...r day at this section, which is near ...e ultimate San Francisco terminus. The estimated 1970 comparable figures ...e 20,000 and 105,000 vehicles per day.

"But vehicles per day are not the only evidence of importance of a ...oute, nor the only justification for ...ilding freeways to modern stand...ds, or spending these sums of money.

Accident Rates Important

"Accident rates are important and ...am able to report to you that on freeways built during the last four years, ...e death rate on them is 73 percent ...ss than the death rate reported for all our highways in the year 1949. To be more specific, in a major city of ...e southland, we have a freeway and ...an ordinary state highway carrying nearly comparable traffic, approximately 45,000 vehicles per day on each, ...ith slightly more on the freeway. The accident rate per million motor vehicle miles on the highway is at the ...ate-wide average; the rate on the ...eeway only one-sixth of that amount.

"Freeways in high traffic areas are ...ot only desirable but highly necessary. I can assure you that your State Highway Commission is concerned with this problem, and that this state ...oute, a portion of which is completed ...r use today, will be constructed to freeway standards as rapidly as pos...ble consistent with the needs, requirements and fairness to other parts of California.

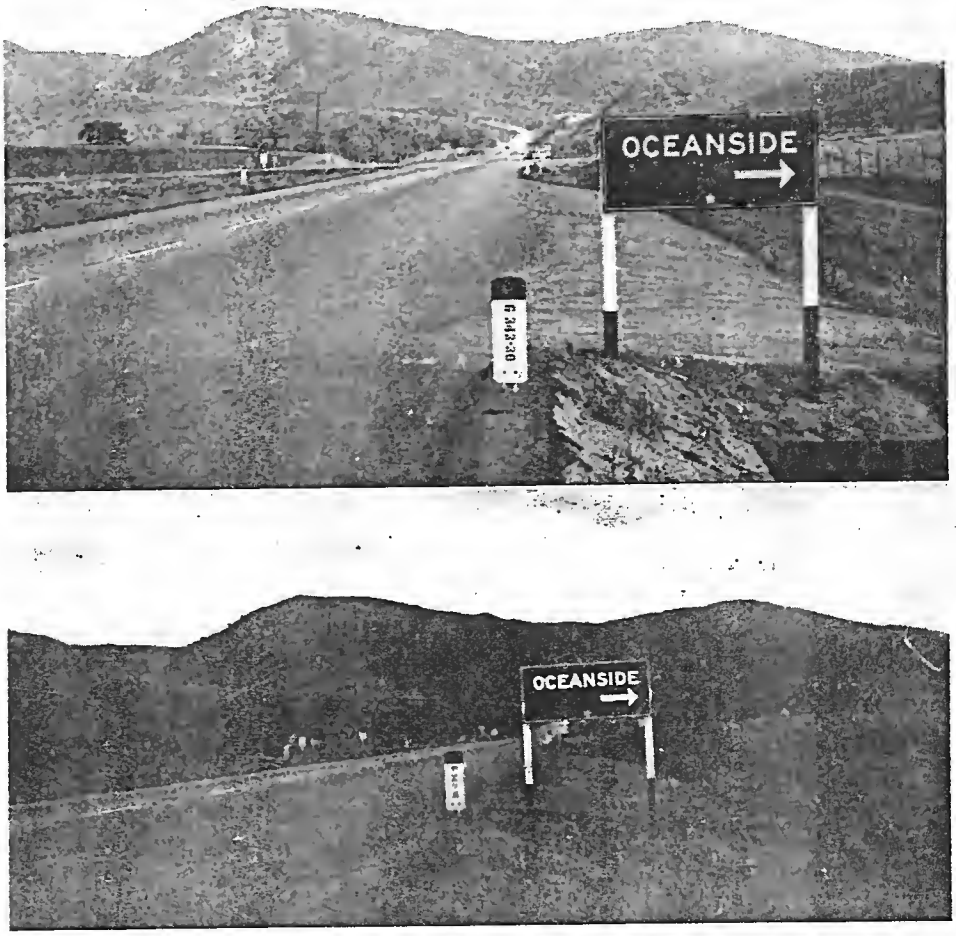
"But let us not be too optimistic ...bout getting this and the other free...ays of California completed at an early date.

"Apparently we have been making ...rogress, substantial progress, in the ...reeway program, not only here but throughout the State of California. ...ut, in fact, we are still losing in the ...ruggle to catch up with the growing demands, the necessary requirements of present-day highway traffic.

"California is still a growing State in every respect except land area. The greatest migration the world has ever known is damming up here on the Pacific Coast. We now have more than 10,500,000 people within our boundaries, and more than 5,100,000 motor vehicles registered for use. More vehicles than any other state in the Union,

...Continued on page 41

OCEANSIDE APPRECIATES HIGHWAY SIGN



UPPER—Oceanside directionol sign visibility in daylight
LOWER—Visibility at sunset

APPRECIATION of the action of the Division of Highways in placing a directional sign at the intersection of State Route 195 and US 395, directing traffic to Oceanside in San Diego County, has been received by Director of Public Works C. H. Purcell from Arthur L. Strong, Chairman of the Highway Committee of the Oceanside Chamber of Commerce.

"The Oceanside Chamber of Commerce," Strong wrote, "requested that a suitable sign directing traffic to Oceanside be erected at the intersection of State Route 195 and US 395. We were given the sign without cost and are very grateful for it and the recognition of the importance of State Route 195.

"We are enclosing a couple of photographs of the Oceanside sign, one taken at 3 p.m. and one at late twilight. We feel that these pictures tell the story better than we could tell it with words."

with which this was accomplished after the freeway had been constructed, is indicative of the enhancement by highway improvement.

The subject property with its two old single family residences was purchased in 1948, prior to the freeway construction, for $17,500 by the owner of the adjoining lot. The improvement on this adjoining lot consisted of a two-story stucco apartment building.

This after-construction photograph shows south end of motel

In the fall of 1950, the owner entered into a 49-year lease with the nationally known Travelodge Corporation for the two lots. The corporation immediately demolished the three old buildings and has since constructed in their place, without cost to the owner, the present modern apartment-motel, containing 15 hotel rooms and 18 bachelor apartments with kitchenettes, shown in the accompanying photograph.

Revealing Figures

The lease provides for a monthly rental to the owner of $300. This is an annual net income of $3,600 to the owner, the equivalent of a 5 percent return on a $72,000 investment because the lessee pays all expenses, including taxes and public utilities, and no management is necessary on the part of the owner.

The property prior to execution of the Travelodge lease indicated a capitalized value of $48,000, based on a 5 percent return on a net income of $200 per month, after subtractions for costs of management, taxes, insurance, depreciation, maintenance, utilities, and incidental operating expenses from the prior average gross income.

The present indicated value of $72,000 is secured by a $242,000 building which guarantees beyond a doubt the payment of the $300 monthly rental for the 49-year term of the lease. By adding the value of the building at the termination of the lease, an amount in excess of the $72,000 is indicated as the present value of the property, which is a 50 percent increase in the two years following completion of the freeway.

Bayshore Freeway

continued from page 39 . . .

more autos in relation to population than any other state or nation in the world, and still they come, crowding our highways with an additional 100,000 or 200,000 cars which individually stay but a short time, but collectively remain pretty much the same total throughout the year.

"This increase in population and vehicle registration, the increase in use per car per year that is taking place, have necessitated changes in design and planning—more traffic lanes—more structures—wider rights of way. Cost of construction per unit is also climbing—35 percent in the last year.

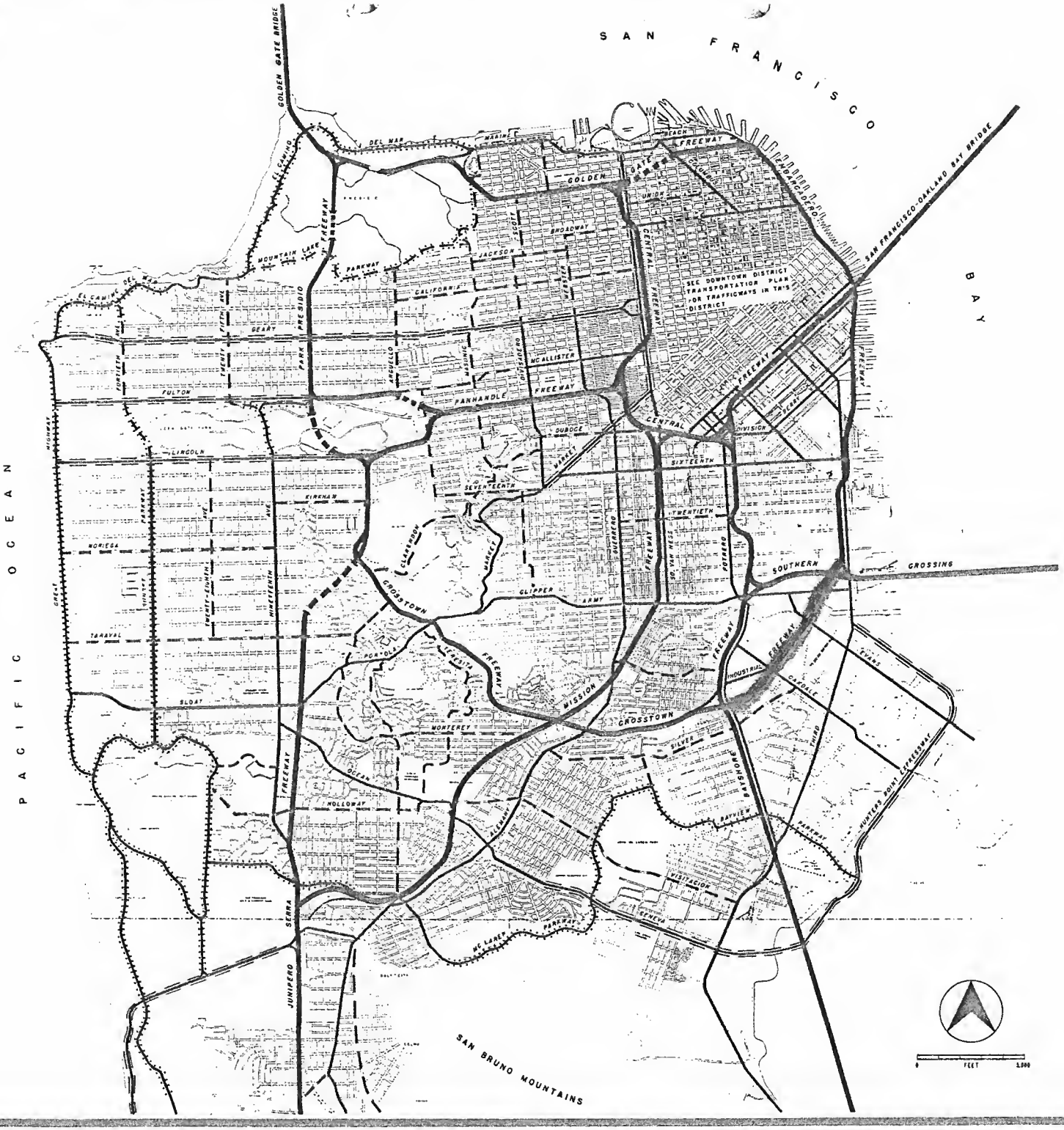
"The result—well, though we have spent or allocated more than $460,000,000 in the first five-year period, the unbudgeted critical deficiencies as of January 1, 1951, now total $3,000,000,000, with an income for rights of way and construction of approximately $100,000,000 per year. San Francisco's portion in this deficiency list amounts to $173,600,000 within her county boundaries. You may do your own calculating as to when this program will be completed.

"I say these things to you, not in advocacy of additional taxes or changed laws, but that you may know the facts, understand the problems of the State Highway Commission and be more charitable to and less demanding of us when we are unable immediately to solve your highway problems, untangle your traffic snarls, and reduce your accident rates as soon as we all would like to see these things accomplished. It all amounts to a Herculean task. Let us all cooperate to build a whole highway system carefully, thoughtfully, with full view not only of the present but also of the future. Let us all with patience join in building California as she should be built."

Charles H. Parker Retires to Enter Private Practice

CHAS H. PARKER, who established the first Hydraulics Department in the Division of Highways, in District VII in 1938, and who has headed, directed and instructed that department ever since, has retired after 23 years with District VII. He persistently advocated a concept of highway drainage based on the utilization of approach velocities, the application of Bernoulli's constant method of nonuniform flow design, and the doctrine that most culvert failures are the result of inlet ponding or outlet erosion.

"Chuck" had completed 38 years of engineering practice and had established and taught enough principles of storm water run-off to satisfy most men, but is determined to pursue his specialty as an avocation and will practice hydraulics, hydrology, and drainage as a consulting engineer.



TRANSPORTATION SECTION OF THE MASTER PLAN OF SAN FRANCISCO

TRAFFICWAYS PLAN

FREEWAYS
MAJOR THOROUGHFARES
SECONDARY THOROUGHFARES
EXPRESSWAY TREATMENT
PARKWAY TREATMENT

THIS PLAN WAS ADOPTED BY RESOLUTION NUMBER 3948 OF THE CITY PLANNING COMMISSION AT A SPECIAL MEETING HELD ON JULY 17, 1951

TRANSPORTATION PART I

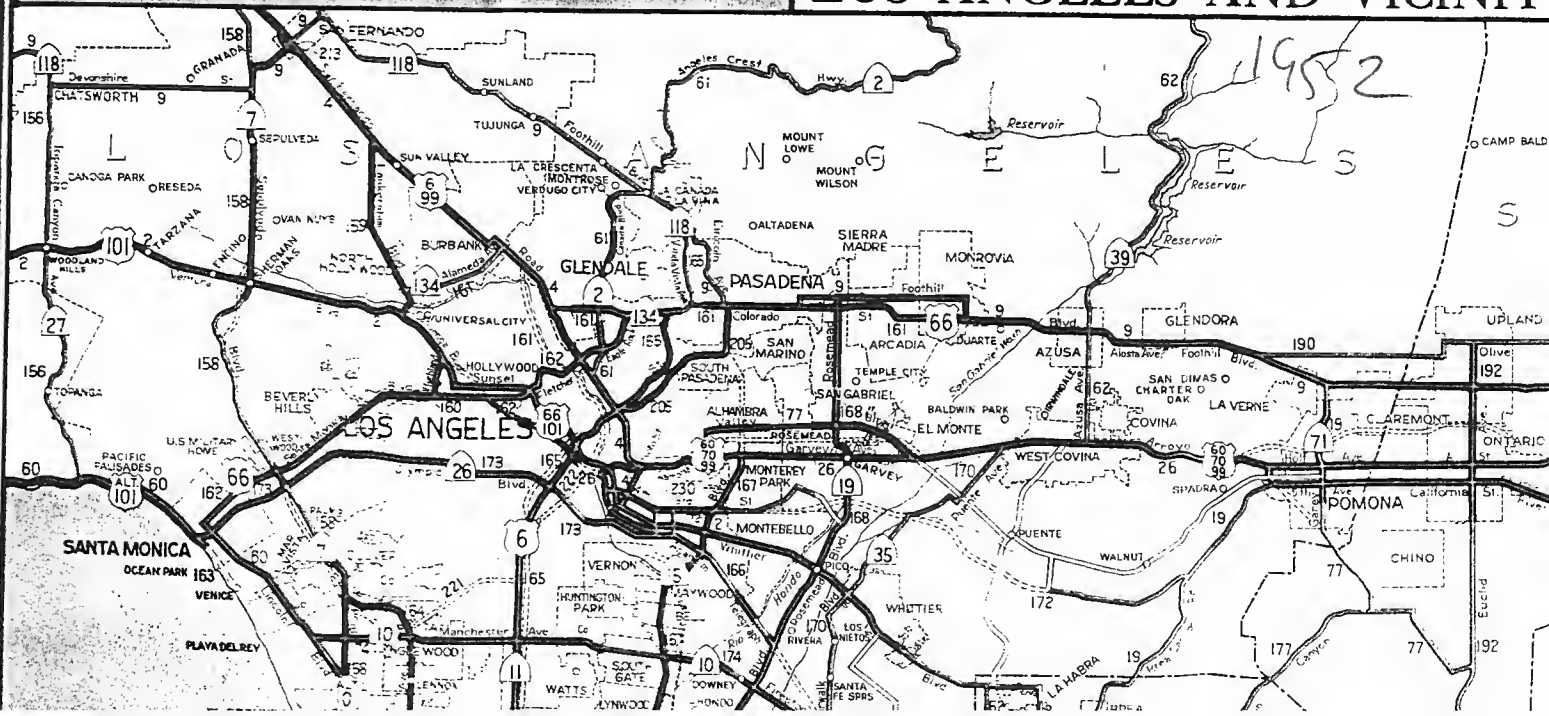
1

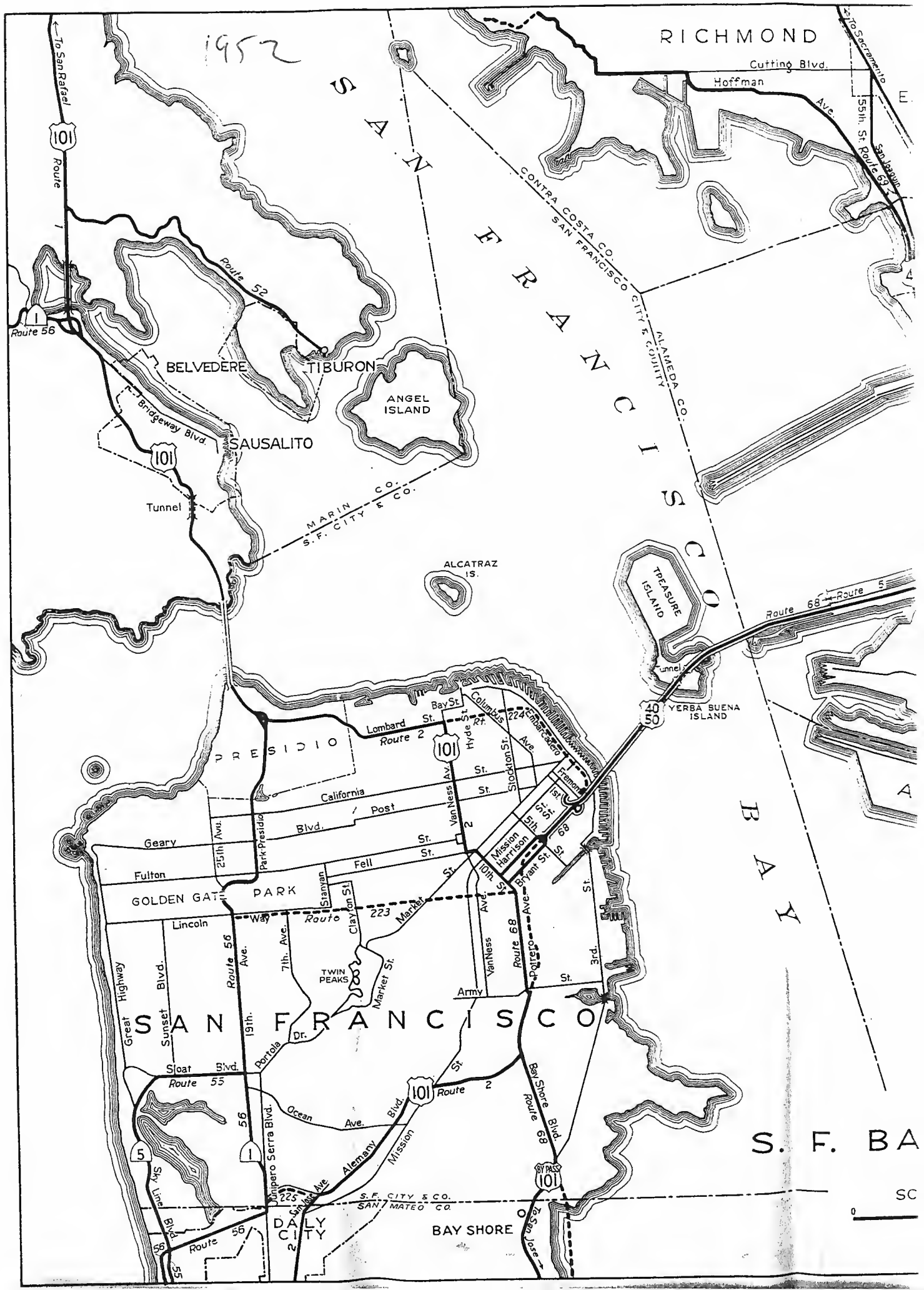
PLATE

SAN FRANCISCO DEPARTMENT OF CITY PLANNING

LOS ANGELES AND VICINIT

1952




1952
RICHMOND
Cutting Blvd.
Hoffman Ave.
To Sacramento
55th. St.
Route 69
San Joaquin
To San Rafael
101
Route 1
Route 52
Route 56
SAN FRANCISCO
CONTRA COSTA CO.
SAN FRANCISCO CITY & COUNTY
ALAMEDA CO.
BELVEDERE
TIBURON
ANGEL ISLAND
Bridgeway Blvd.
SAUSALITO
Tunnel
MARIN CO.
S.F. CITY & CO.
ALCATRAZ IS.
TREASURE ISLAND
Route 68
Route 5
YERBA BUENA ISLAND
PRESIDIO
Lombard St.
Route 2
Bay St.
Columbus Ave.
Hyde St.
Embarcadero
Stockton St.
Fremont
California St.
Post St.
Van Ness Av.
Geary Blvd.
Fulton St.
Fell St.
Mission St.
Harrison St.
Bryant St.
GOLDEN GATE PARK
Lincoln Way
Route 223
Market St.
Clayton St.
Stanyan
Park-Presidio
25th Ave.
7th. Ave.
19th. Ave.
Route 56
Great Highway
Sunset Blvd.
TWIN PEAKS
Market St.
Van Ness Ave.
Route 68
Potrero Ave.
Army St.
3rd. St.
SAN FRANCISCO
Portola Dr.
Sloat Blvd.
Route 55
Route 2
Bay Shore Blvd.
Route 68
Ocean Ave.
Alemany Blvd.
Mission St.
Junipero Serra Blvd.
Sky Line Blvd.
Route 56
DALY CITY
S.F. CITY & CO.
SAN MATEO CO.
BAY SHORE
To San Jose
BY PASS
S. F. BA
SC

Plan Fly Oakland Airport Week Celebration

THE OAKLAND BOARD OF PORT COMMISSIONERS has pledged its cooperations in plans of the aviation committee of the Oakland Chamber of Commerce to hold a Fly Oakland Airport week in the near future.

Fred B. McCormac, chairman of the Chamber's aviation committee, informed the Board that the board of directions of the Chamber has endorsed a Fly Oakland Airport campaign, which it is hoped will materially assist joint efforts of the Chamber and the Board to secure adequate air transportation service directly serving Oakland Municipal Airport.

McCormac said that the proposed program, calling for a week of concentrated promotion and activity at a date to be selected later, is directly in line with the policies of the Board.

Dudley W. Frost, president of the Board, informed McCormac that the port group will be pleased to co-sponsor the observance and will await further word from the committee.

Building Record

Aided by permits for a new administration building at San Francisco Airport and a new hospital at Burlingame, San Mateo County registered its greatest building record last year.

Permits totaled more than 27 million although home building was down from the peak year of 1947 when 26 million were spent on new construction, principally houses.

County officials said prospects for 1952 appeared good and permits might top the new record.

New Grand Jury

A new San Mateo County Grand Jury will be impaneled shortly by Superior Judge Murray Draper.

The new group is expected to spend most of its time checking county government since state and local authorities have virtually eliminated gambling in the county.

The 1951 group which served under Judge Edmund Scott was dismissed last month.

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SAN LEANDRO, CALIF.

Policeman Promoted

Sgt. Frances P. Barrett has been promoted to lieutenant in the Richmond Police Department to fill the vacancy created by the recent resignation of Lieut. L. B. Bradeson, Police Chief E. F. Phipps reported. Barrett, who topped the eligibility list, will supervise the in-service training program of the department. He has been in the department since 1942.

Marvin E. Lewis
ANNOUNCES THE REMOVAL OF HIS LAW OFFICES
TO SUITE 1700, CENTRAL TOWER BUILDING
AND HIS ASSOCIATION WITH
Martin E. Field
UNDER THE FIRM NAME OF
LEWIS and FIELD
703 MARKET STREET
SAN FRANCISCO 3, CALIFORNIA
EXbrook 2-2427

SAN FRANCISCO TO SPEND $1,500,000 IMPROVING STREETS BEFORE JUNE 30

The Department of Public Works plans to invest more than $1,500,000 in street improvements by the end of the current fiscal year, June 30, according to Works Director, Sherman Duckel.

Mayor Elmer E. Robinson and the Board of Supervisors have been asked to approve the following projects:

Installation of new three-light traffic signals, with "wait-walk" signals for pedestrians, on both sides of Market street from The Embarcadero to Tenth Street, cost $290,000.

Reconstruct Geneva avenue from Prague Street to Mission Street to include a six-foot center island with safety lights: $228,000.

Repave Clay Street from Scott Street to Arguello boulevard, creating new parking lanes, $220,000.

Resurface Clarendon avenue from Stanyan Street to Laguna Honda boulevard, including construction of four-foot center islands, $110,000.

Widen upper Market Street between Ord and Eureka Streets, $20,000.

Plans and specifications for construction of 1½ blocks of proposed Mission Freeway between 13th Street and Alemany boulevard, $20,000.

Remove brick pavements and construct new pavements on Bush Street from Hyde to Larkin and from Grant to Stockton, $24,000.

Construct four-center islands in Alemany boulevard, San Jose avenue to Junipero Serra Avenue, $84,000.

An appropriation of $446,000 was asked for signalization and traffic channelization at various additional intersections throughout the city.

SHERMAN P. DUCKEL
Director, Department of Public Works
City and County of San Francisco

S. F. BAR TO EXPAND LEGAL AID PROGRAM

Support of an expansion program for the San Francisco Legal Aid Society has been voted by the board of governors of the San Francisco Bar Association, Herbert W. Clark, president announced.

The program calls for the solicition of financial aid to pay for a larger legal staff. The society has offices at 767 Market Street.

The society is currently processing about 250 cases a month with one full-time lawyer, Mrs. Elda Parlini. This, represents "alarmingly" inadequate facilities, Mr. Clark said.

Arthur S. Hallidie invented San Francisco's cable cars.

WALTER HASS, JR., NEW PRESIDENT OF GUARDSMEN

Walter A. Haas Jr., has been elected president of the Guardsmen for 1952, the organization's directors, have announced. He succeeds Albert E. Schwabacher Jr.

A charter member of the Guardsmen, Haas is a director and assistant secretary of Levi Strauss and Co.

Other new Guardsmen officers are Richard B. Sims, first vice president; William R. Knapp, second vice president; Stanford P. Lowengart Jr., secretary; Philip M. Robertson, treasurer, and John S. Enright, Lancaster R. Fontaine, Arthur C. Oppenheimer II, J. B. Rodgers, Walter H. Sullivan Jr., John Swain and Dr. Philip R. Westdahl, directors. Thomas J. O'Toole will continue as executive secretary.

The Guardsmen now are making plans for their 1952 fund drive to send 3,500 children to summer camps.

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Mar – Apr 1952

HISTORY OF UNITED STATES NUMBERED HIGHWAYS

By M. A. O'BRIEN, Highway Signing Supervisor

To THE MANY historical events credited to San Francisco we find, upon investigation, that our present system of U. S. numbered highways may be added as it also had its origin in that city. While the idea was previously conceived and discussed by the officials of the Bureau of Public Roads and many state highway officials, the first step leading to the development of an interstate highway system was brought forth at the annual meeting of the American Association of State Highway Officials held in San Francisco during November, 1924.

There was a definite need for the marking of interstate highways and routes of travel which was partially satisfied by the various trail associations. Many individuals sought to capitalize on the popular demand for interstate and cross-country routes by organizing trail associations, collecting large sums of money from our citizens, and giving practically no service in return. This action discredited the many reputable trail associations which had heretofore rendered a distinct public service by stimulating highway improvement.

Haphazard Naming

Some of these organizations proposed routes through cities and towns that had contributed to their cause even though the route selected and identified would not be the most direct and best way for through travel. The old method of giving names to various highways prevented any uniform system of marking since highway names frequently were not continued into adjoining states and in several instances the same major highway would have two or more names in one state. Civic-minded groups vied with each other in naming various highways. Roads were named as the result of political pressure more often than for historical reasons. Too frequently local names were assigned a highway without markers of any kind being placed to identify the route. Local groups in one section often disagreed with other areas on the choice of a name. It frequently happened that this difference of opinion between neighboring groups was a source of considerable embarrassment to highway officials who now universally accept the system of highway numbering. Mr. Herbert Hoover, when Secretary of Commerce, is credited with making the original suggestion to establish a system of U. S. numbered highways.

A. A. S. H. O. Takes Action

The American Association of State Highway Officials in the San Francisco meeting of 1924, heard a paper on the subject of Interstate Highways presented by E. W. James, Chief of the Division of Design for the Bureau of Public Roads. This original report by Mr. James was approved and the state highway officials, on November 20, 1924, adopted the following resolution:

"This assaciation hereby requests the Secretary af Agriculture, in cooperation with the several states, ta undertake immediately the selectian and designatian af a camprehensive system af thraugh interstate rautes and ta devise a camprehensive and unifarm scheme far designating such routes in such a manner as ta give them a canspicuaus place amang the highways of the Country as raads af interstate and natianal significance.

"Ta mare satisfactarily carry aut these suggestians and abtain speedy and satisfactary results, this assaciatian requests the Secretary af Agriculture ta appaint a baard ta be campased af members af the Bureau af Public Raads and af the state highway departments ta caaperate in farmulating and pramulgating a system af numbering and marking highways af interstate character."

Board Appointed

This resolution was presented to the Secretary of Agriculture. He concurred, and on March 2, 1925, appointed a board to make a study and submit recommendations. Thomas H. MacDonald, Chief of the Bureau of Public Roads, was named as Chairman; E. W. James, Chief of the Division of Design, Bureau of Public Roads, was named as Secretary; the other members were highway officials nominated from 21 states.

The various state representatives were divided into six regional groups, which acted on highways within the states embraced in their respective geographical areas. The 11 western states were named the "Western Group" and were represented by Robert M. Morton, State Highway Engineer for California; Roy Klein, State Highway Engineer for Oregon; Preston G. Peterson, Chairman, State Road Commission for Utah; James A. French, State Highway Engineer for New Mexico.

Similar groups were formed for other sections of the Nation as follows: Mississippi Valley Group representing 11 states; Lakes Group representing six states; Southern Group representing nine states; North Atlantic Group representing five states; and the New England Group representing six states. These groups had their meetings and reported to a Joint Board on Interstate Highways.

First Joint Board Meeting

The first full meeting of the joint board was held in Washington, D. C., on April 20, 1925. Resolutions were adopted which formed the basis for designation of the system of United States highways. The board recommended the immediate selection of transcontinental and interstate routes from the Federal Aid Road System and that these routes be continuously designated by means of a standard highway marking sign. It voted, also, that a system be established and marked to satisfy the demand for marked routes on the part of transcontinental and interstate traffic. This marking was to meet a need which in the past had been partially satisfied by the marked trails,

established by various trails associations. It was further voted to allow the several states to continue the marking of existing trails and memorial highways pending the establishing of the proposed marking system unless such action would conflict with the marking systems and policies now in force in the several states. A resolution "that no trail association be permitted to establish further routes on state or federal-aid routes" was adopted.

Signs Adopted

A second meeting of the joint board was held in Washington, D. C., on August 3, 1925, which adopted the reports and recommendations of the six territorial groups. The numbering system was adopted at this meeting. Our present standard U. S. shield with a white background and black lettering and a system of uniform warning, regulatory, and directional signs were also adopted for installation on these interstate highways.

As a basis for selecting the highway routes for the various states, it was decided that the mileage of these U. S. highways be confined to not more than 3 percent of the total certified rural miles within a state. At that time, the federal-aid system consisted of interstate and intercounty roads and was limited to 7 percent of the total mileage of rural roads then existing. The certified miles of rural highways in California in 1925 totaled 70,000 miles. The Western Group, in its meeting, had designated 2,599 miles in California as U. S. highways which was 3.7 percent of the certified miles. However, the joint board which met in Washington, D. C., in August, 1925, reduced this group selection to 2,220, or 3.1 percent of the certified miles to be the U. S. Highway System in California.

Routes Selected

The findings and report of the joint board was presented to the American Association of State Highway Officials at its annual meeting held in Washington, D. C., in November, 1926. A resolution was adopted at that time to proceed with the program as submitted by the joint board.

Even numbered U. S. routes run east and west. This shows sign on U. S. 40

The committee assigned all odd numbers for highways which run in a north and south direction and assigned even numbers for highways which run east and west. The lowest east and west numbers parallel the Canadian border.

The routes and numbers selected were referred to the various state highway departments for review as to the extent and general location of the U. S. routes to be marked. It was felt that each state highway department should select the best available routes and locate U. S. highways over roads where proposed improvements and realignments would be made.

In California

The original selection consisted of 76 primary highway routes throughout the United States. U. S. Highway 1 was to follow the Atlantic Coast, and U. S. Highway 101 to follow the western coast of California. It was found necessary and advantageous to have some U. S. highways as connecting laterals between other major routes. Where this has been done, the number of the major route is retained and the lateral route has the addition of a third digit. One example of this system in California is applied to U. S. Highway 99, the main north and south route which passes through the central part of California. The number "99" has been retained to mark three of the laterals; we therefore have U. S. Highway 199, U. S. 299, and U. S. 399, all of which connect U. S. 99 with some other U. S. highway.

(To be continued)

May - June 1952

In an address before the twenty-eighth annual convention of the Mission Trails Association in Santa Monica on May 23d Highway Commissioner Harrison R. Baker, in reviewing improvements made on U. S. 101 which Father Junipero Serra and his padres mapped out 180 years ago when they were founding their string of missions, used the accompanying sketches by Van der Goes, Bridge Department, Division of Highways, to illustrate his talk.

Baker said in part:

"The California Highway Commission necessarily works and thinks in terms of our tremendous load of highway deficiencies. Of our nearly 14,000 miles of state highway, more than 11,000 are deficient in one or more respects—structurally, or from the standpoint of safety, or, most glaring of all, because of inadequate traffic capacity. Your association is acutely aware of these deficiencies in the counties which you represent, and the Highway Commission appreciates and values your continued counsel in our effort to accomplish the most possible within the limits of legal requirements and available financing. You have helped to center public attention on the need for highway improvements, and you have been equally ready to center public attention on projects which have been completed and which enhance the pleasure of the motorist in following the "path of the padres."

"The opening this month of nearly four miles between Palm City and Chula Vista brings the Montgomery Freeway to completion from Palm City to San Diego. North of the city, the widening of U. S. 101 from Del Mar to Encinitas has been provided for in the 1952-53 Budget.

Oceanside-Carlsbad Project

"Work is well under way on more than 11 miles of freeway which will eliminate bottlenecks in the Oceanside-Carlsbad area; several contracts are involved, including the widening of the bridge over the San Luis Rey River. They total nearly $9,000,000. The most recent contract, on the section through Carlsbad, was awarded one month ago.

"Beginning in Orange County we enter the region of what is perhaps the most ambitious concentrated planning program of highway construction ever undertaken—the Los Angeles Metro-

politan Freeway network. A portion of this network is already in operation. One of its major units—the 10-mile Hollywood Freeway between the Civic Center and Vineland Avenue in the San Fernando Valley—has been completely financed, and construction is under way on the final sections between Western Avenue and Cahuenga Pass. By the end of 1953 the Hollywood Freeway should be completed.

Los Angeles Freeways

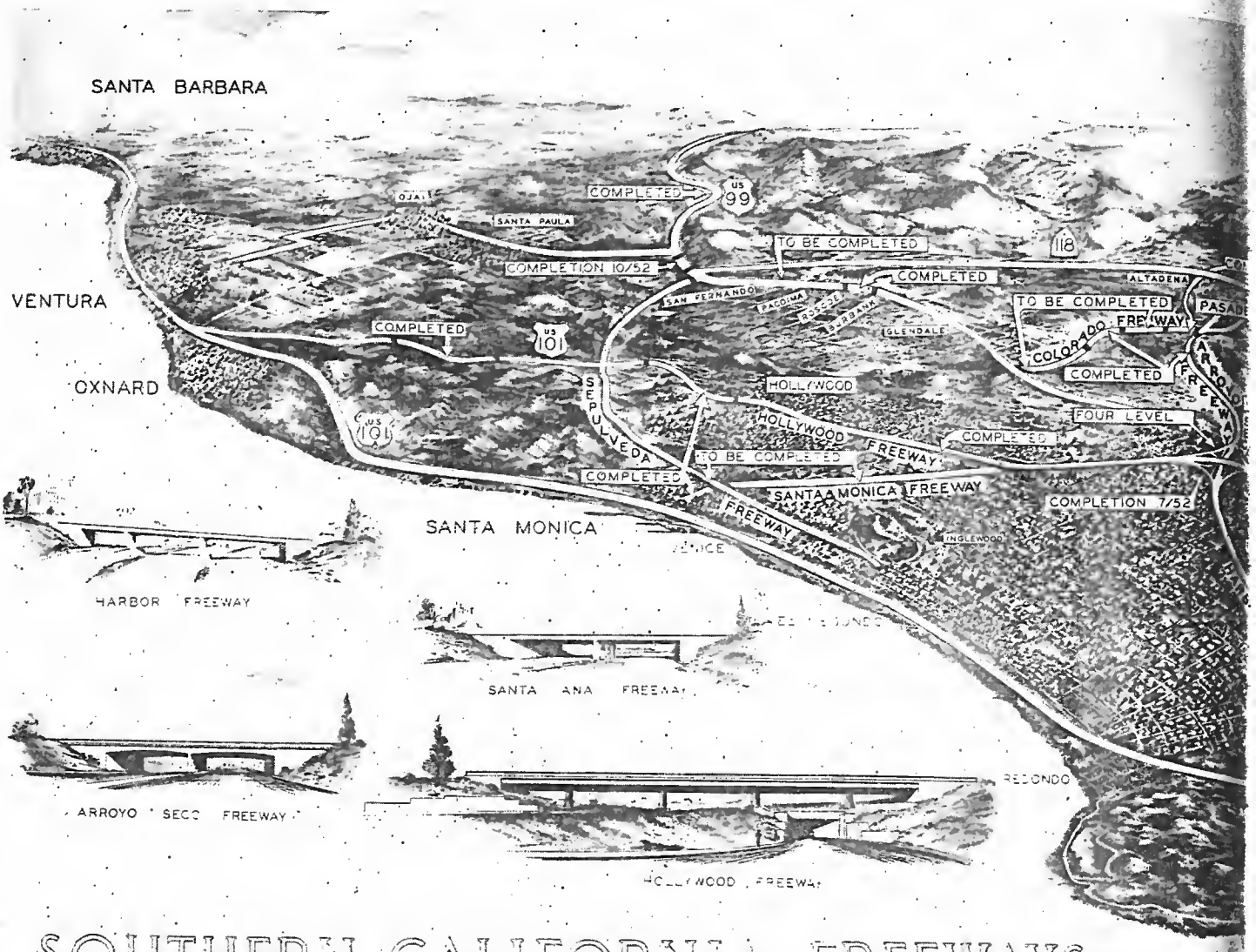
"In the meantime, work is under way on the short connection just east of the Civic Center which will link the Hollywood and the Santa Ana and Ramona Freeways; on the connection between the four-level distribution structure and the Arroyo Seco Parkway; on the Harbor and River Freeways; and on the new Colorado Freeway Bridge.

"The Los Angeles Metropolitan Freeway System is important to your association in more ways than one. It not only enhances the visitor's motoring pleasure and permits him to spend more time on recreation and less time battling traffic; also, because of its bold conception and well-designed construction it cannot help but serve as a tourist attraction in itself. Publications of national circulation have been asking increasingly for pictures and information about it. We may come to find in the next few years that the nucleus of the metropolitan freeway network, the four-level distribution structure, is one of our most famous Mission Trails landmarks.

In Ventura County

"In Ventura County, I am happy to report that construction is scheduled to begin this summer on the grade separation over the Southern Pacific main line tracks at Camarillo. This $600,000 overhead will eliminate the last remaining grade crossing of U. S. 101 and the Southern Pacific main line between Los Angeles and San Francisco. Another Ventura County project was just completed a few weeks ago: the short but important four-lane divided section between the Santa Clara River Bridge and Montalvo.

"A little west of the Ventura County line in Santa Barbara County, construction is well under way on the 3½ miles of expressway west of Carpinteria which leads up to Ortega Hill.



SOUTHERN CALIFORNIA FREEWAYS

THE METROPOLITAN AREA OF LOS ANGELES AN

Gaviata Pass

"North of Santa Barbara, you will be particularly interested in the Gaviota Pass project which is now in full swing. In 1950 the Division of Highways started on a three-year program to improve the scenic eight-mile section from Gaviota north over Nojoqui Summit as a four-lane divided highway. The Nojoqui Summit portion was completed last fall. The section just south of it, from the north end of Gaviota Gorge to Las Cruces, is scheduled for completion in the next few months. The contract for the three miles northerly from the settlement of Gaviota was awarded April 1st and construction is under way. Meanwhile, work on the Gaviota tunnel, which was holed through in February, is in full swing. It is through this tunnel that the northbound traveler will pass on his journey along El Camino Real.

"As you know, the historic importance and interest of Gaviota Pass is inseparably linked with its topography. The steep, narrow defile which played a unique role in the conquest of California by Fremont could very well have been altered beyond recognition by excavation for a new roadway. Instead, the new roadway will go through the heart of the rock for 420 feet, and the historic integrity of the gorge will be preserved. The south portal of the tunnel will be finished with a sandstone-colored stain so that it will blend in with the landscape as far as possible. Plans also included a parking area several hundred feet south of the tunnel. The bronze plaque which tells the story of the pass will be moved to the parking area for the edification of the traveler.

In San Luis Obispo County

"There is a good deal of progress to be observed in San Luis Obispo County, also. A good start is being made on the freeway through the City of San Luis Obispo, with several grade

separation structures under way. A contract for two more structures was awarded on May 6th.

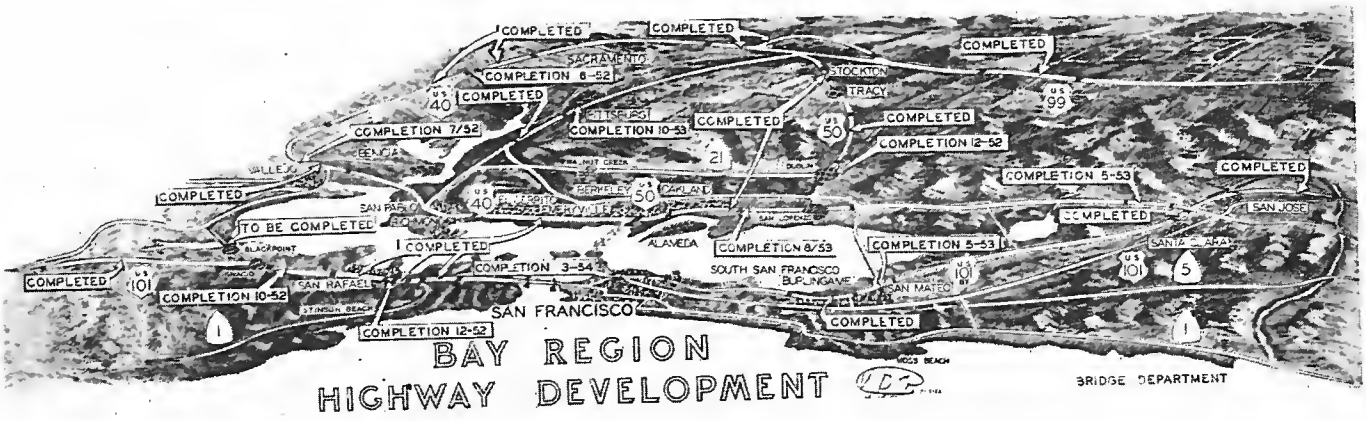
"The four-lane divided construction between Atascadero and Templeton was completed last July. This expressway will be continued on through Paso Robles. Grading of the southerly six miles will be completed in August, and bids have been called on the remaining grading and on some of the surfacing. They will be opened on June 4th, which means that construction will continue on this project without interruption.

"A start has been made on the gigantic job of improving the long stretch of U. S. 101 which follows the Salinas River through Monterey County. Two new lanes were completed last fall for 5.3 miles north from Chualar. The new roadway is being used while the old section is being brought up to modern standards; this contract has just got under way.

Salinas Freeway

"The long-planned freeway through Salinas is about to become a reality. Bids will be opened in Sacramento next Wednesday for 1.6 miles of grading, paving and structures north from Alisal Road, the first unit of this important project.

"In Santa Clara County, a large share of attention has been devoted to the southern end of the new Eastshore Freeway, but numerous other projects have been and are being carried on. The most recent ones have been the surfacing of five one-half miles of U. S. 101 in the vicinity of Gilroy and the widening and surfacing of a section just south of San Jose. Projects are also under way and budgeted which will improve Sign Routes 9 and 117, leading to Santa Cruz. The relocation of Sign Route 17 in the vicinity of Lexington Dam has just been completed.



Bayshore Freeway

"On the Bayshore Highway there is a good deal of activity under way in an attempt to remedy the congestion and accident situation during the necessary interval while freeway construction is pushed forward. Lights and signals are being installed, and traffic channelization projects are being constructed and planned. Meanwhile, construction is in progress on the extension of the freeway from the north to the south city limits of San Mateo.

"In San Francisco itself construction on the Bayshore Freeway north from Army Street is continuing. Bids were opened on May 14th on the initial grading and structures in the important section lying between Sixteenth and Seventh Streets.

"In the meantime we are proceeding at full speed on our present basis. The Highway Commission is continuing to lay the groundwork for future development by declaring additional miles of U. S. 101 and other highways as freeways, after concluding freeway discussions with the local governmental agencies concerned. This is done, of course, far in advance of actual construction. For example, during the past several months the commission has concluded freeway agreements and adopted routings of U. S. 101 for three miles through and near the town of San Miguel and for eight miles in Santa Barbara County between Buellton and Los Alamos. The mileage of declared—not constructed—freeway on the coast route between San Diego and San Francisco now amounts to 345 miles, or about 63 percent of the total distance.

Advance Planning

"Advance planning is particularly important in view of the need for highways built on freeway design standards, with a minimum of entrances, exits and turns at grade to impede the flow of through traffic. It is obvious that the earliest possible selection of the best and most economical route is not only essential to protect property values, but also to ensure orderly long-range community planning and to prevent costly misunderstandings.

"In considering the highway conditions from a state-wide view and from the view of U. S. 101 improvement you will recall that some 11,000 miles of the 14,000 miles of state highways are deficient in one respect or another, with the estimated cost of correction being about three billion dollars. Of the 550 miles of U. S. 101 from the Mexican border to San Francisco, some 420 miles are included in the list of current deficiencies, with estimated cost of correction being about $259,000,000. This cost on U. S. 101 is the balance which will remain after the completion of $21,000,000 worth of major improvements included in the 1952-53 Budget."

"FOLLOW THE LEADER" DANGEROUS GAME

Don't play "follow the leader" in traffic, warns the National Automobile Club. Just because the other fellow slipped through that stop sign or cut in on that other car is no indication that you can do so safely. When you indulge in such tricks you are taking these long chances that lead to a short life.

Restoring of Mission Bells Is Proposed

Restoration of the picturesque mission bells of El Camino Real, long a symbol of California to tourists, has been proposed to the Mission Trails Association.

"The bells are rapidly disappearing, either through vandalism or relocation of U. S. Highway 101." it was pointed out in a letter to Jack Daugherty, President of the Mission Trails Association, by E. E. East, Chief Engineer of the Automobile Club of Southern California.

Few of the original 450 bells erected along the El Camino Real from San Diego to Sonoma are still standing. And some of these were left along the old highway after the relocation of Highway 101, East said.

Designed by the late Mrs. Armitage S. C. Forbes, historian of old California, the first bell was erected in 1906 at the Plaza Church in Los Angeles.

Within a decade, the Mission Trails Association, then known as El Camino Real Association, had placed an average of one every mile along the historical route followed by Don Gaspar de Portola in 1769.

The original bells were donated to the Mission Trails Association by counties, chambers of commerce and civic groups, and maintained in Southern California by the auto club.

East said he discussed the replacing and relocation of the bells with some supervisors and other county officials, who indicated they would cooperate in restoring them.

May - June 1952

HISTORY OF UNITED STATES NUMBERED HIGHWAYS

By M. A. O'BRIEN, Highway Signing Supervisor

This is second of two installments of an article by Mr. O'Brien.

THE FOLLOWING policies have been established by the American Association of State Highway Officials regarding the numbering and marking of U. S. highways:

1. The executive committee of the American Association of State Highway Officials shall have full authority to review the U. S. numbered road system and the numbering and marking thereof, to make additions, changes, extensions, revisions, or reductions in said road system and to revise the numbering or marking thereof.

2. Before approving any addition, change, extension, revision, or reduction in the U. S. numbered road system, or the numbering or marking of any U. S. numbered road, the executive committee shall consult the state highway department of the state or states through or within which such addition, change, extension, revision, or reduction is located.

National Policies

3. The state highway department, by a favorable vote on the adoption of this program and policy, agrees and pledges its good faith that it will not erect U. S. markers on any road or take down or change the U. S. markers on any road without the authorization, consent, or approval of the executive committee of the American Association of State Highway Officials, notwithstanding the fact that the changes proposed are entirely within that state.

4. No additional road shall be added to the U. S. numbered road system, and no existing U. S. road shall be extended except where there is a definite showing of an adequately improved highway carrying an established and necessary line of interstate traffic not otherwise provided for by existing U. S. routes and for which traffic adequate service cannot be provided by state route numbers. Extension of present U. S. numbered routes may be made only when the proposed extension is in the general direction of the present route.

   Proposed extensions shall not be made when, to do so, it is necessary to duplicate U. S. routes already established, unless the duplication is for a short distance and the routes then diverge, ending in different terminal points.

5. No new U. S. route located wholly in one state shall be established. U. S. routes, less than 300 miles in length, theretofore established and located wholly in one state, shall be eliminated either by consolidation with other U. S. routes or by reverting to state routes, as rapidly as the state highway department and the Executive Committee of the American Association of State Highway Officials can reach agreement with reference thereto.

North and south U. S. routes are odd numbered as shown above.

First Markers in State

At the time the U. S. Highway System was approved and adopted, the road signing activities in California were carried on by the two major automobile clubs; the California State Automobile Association placed signs in the 45 northern counties and the Automobile Club of Southern California provided service in the 13 southern counties. This work was undertaken on state highways, county roads, and city streets entirely at the expense of the membership of these two clubs.

A search of the records of the California State Automobile Association and Automobile Club of Southern California show that the first markers were placed in California during the month of January of 1928. In the northern area, markers were erected on U. S. 40 from Berkeley to the Nevada state line while in the southern area, U. S. 101 was being signed from Los Angeles to San Diego. Following the marking of U. S. 40, signs were then installed on U. S. 99. This work was coordinated with the signing activities of the Automobile Club of Southern California. The signing of U. S. 101 followed during the summer months in 1928. The two automobile clubs informed the writer that when the U. S. markers were placed, all the old style diamond-shaped directional signs were removed and the new black on white rectangular-shaped signs were provided. Following the signing of U. S. 101, markers were then placed on U. S. 66 and U. S. 91.

State Takes Over

Between the years 1928 and 1934, there was very little activity in the signing of U. S. highways in California. Between these dates the Uniform Manual of Traffic Control Devices was published which set forth certain standards in the marking and positioning of U. S. route markers and arrows.

When the Division of Highways undertook the responsibility of signing for the highways in 1934, it was deemed advisable to review the signing of these routes and bring the signing in conformance with the recently adopted standards. Accordingly, surveys were made of all the major highways, and U. S. routes were completely marked including signing through cities which, in some cases, had been omitted in 1928. Since that time, of course, additional U. S. highways have been approved by the American Association of State Highway Officials and there are now 23 U. S. highways completely signed in California with a total length of approximately 5,958 miles.

On State Sign Routes

Since the U. S. highway numbering system can only be applied to the interstate highways, it was found desirable to mark local routes of travel with a system of state numbered highways, customarily referred to as state sign routes. The sign routes provide a marking system for those highways which are intrastate. Accordingly, meetings were held by the representatives of the two automobile clubs and the maintenance engineer to devise a numbering system for other California highways. A route marker now known as the "bear shield," was adopted from a wide range of designs submitted. The present route marker was adopted as it resembled the miner's spade and displayed a grizzly bear taken from the California Bear Flag.

In selecting numbers for the state sign routes, a numerical system following the U. S. Highway System was adopted. All routes that follow a more or less north and south direction were given odd numbers; the east and west routes were given even numbers. In order to avoid, as far as possible, any claims of partiality between the north and the south, the smaller numbers were evenly divided between these two areas. State Sign Route 1 was assigned to the coast route between Las Cruces in Santa Barbara County to Westport in Mendocino County. This route traverses both the north and south portions of the State. After this number was used, the next odd and even numbers were assigned in pairs; i.e., 2 and 3 were given to the south, and 4 and 5 to the north, etc. An effort was made to have the numbers increase for north and south routes as you proceed from west to east.

In selecting numbers for the state sign route system, numbers given to existing U. S. highways were purposely omitted so that there would be no duplication. The marking of state sign routes began in the fall of 1934 and has been progressive through the intervening years.

At the present time there are 76 state sign routes in California with a total of 7,486 miles.

This is a state sign route marker located on State Sign Route 89 bordering Lake Tahoe.

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v.32-34
Jan-Feb
1953

San Francisco Bayshore Freeway Progressing

Five Separate Contracts Now Are Under Way

By WEBB HITE, Resident Engineer, and
A. C. BIRNIE, District Budget Engineer

On June 1, 1951, the first completed unit of the Bayshore Freeway within the City of San Francisco was officially opened to traffic. That unit extends from Augusta Street to 25th Street and is 1.3 miles long.

Five separate contracts, now in progress, will extend the completed freeway from 25th Street to Seventh Street, a total length of 2.0 miles, and will include construction of an elevated connection between the freeway and Mission Street, approximately 0.7 mile long.

The Wye viaduct, which is a portion of the Division Street Interchange, is financed in the 1953-54 Fiscal Year Construction Program. It is contemplated that this project will be advertised for bids in April, 1953. The amount budgeted for construction is $1,015,000.

Millions for Project

Also financed in the 1953-54 Fiscal Year Construction Program is the portion between Hester Avenue and Alemany Boulevard, 1.7 miles long, which extends the freeway southerly from the completed portion to south of Third Street where an extensive interchange providing for a major diversion of traffic is to be provided. Advertising of this project is contemplated for early this year. The amount budgeted for construction is $3,350,000.

Only the southernmost and northernmost units of the freeway within the city remain to be financed. These are the portions between the south city limits and Salinas Avenue, 1.0 mile in length on the south, and on the north from Eighth Street to the San Francisco-Oakland Bay Bridge, 0.8 mile in length. Most of the right of way for these units has already been acquired. It is estimated that approximately $8,500,000 will be required to complete right of way acquisitions and for construction of these remaining units. Construction is contemplated as soon as limitations of financing and timing of construction will allow.

Open Water Unit

The time for construction of the unit between the south city limits and Salinas Avenue is dependent on the financing and constructing of the earth fill relocation across a portion of San Francisco Bay in San Mateo County generally referred to as the "Open Water Project." That project is of prime importance to the proper functioning of the Bayshore Freeway in eliminating severe congestion at the gateway to the city. Some construction has been done on this section in the form of experimental fills. When all units within the city are completed, there will be a six- and eight-lane freeway facility, on new location, from the south city limits of San Francisco through severely congested residential, industrial, and business areas, to the San Francisco-Oakland Bay Bridge. Adequate provisions for the expeditious, convenient and safe distribution of traffic to various destinations along the route and within the heart of San Francisco are being provided. The total construction cost will approximate $26,000,000. The cost of right of way and right of way clearance through developed areas such as this require very large expenditures in addition to the construction cost. The problems of right of way clearance are understandably complex and entail months and sometimes years of cooperative planning and negotiation with affected property owners.

Many Major Problems

Many major problems typical of freeway construction within a metropolis have been encountered on the various contracts to date. Comprehensive planning at an early date has been necessary in the acquisition of right of way and in the relocation of public utilities in order to keep construction delays to a minimum. Considerable work has been involved during construction in the removal of foundations and basements from the right of way. All types of utilities are being relocated including railroad tracks, sewer lines, water mains, power and telephone facilities. One of the most difficult being handled by contractor's forces is the relocation of the city's high pressure water lines which range in diameter from 10 inches to 20 inches and which are used only for fire prevention. The work is slow and tedious and involves careful planning as, due to serious fire hazards, the lines may be shut off for short periods only. In general, most of the utility installations have been altered by the utility company's own forces, and here again, careful planning and coordination is involved.

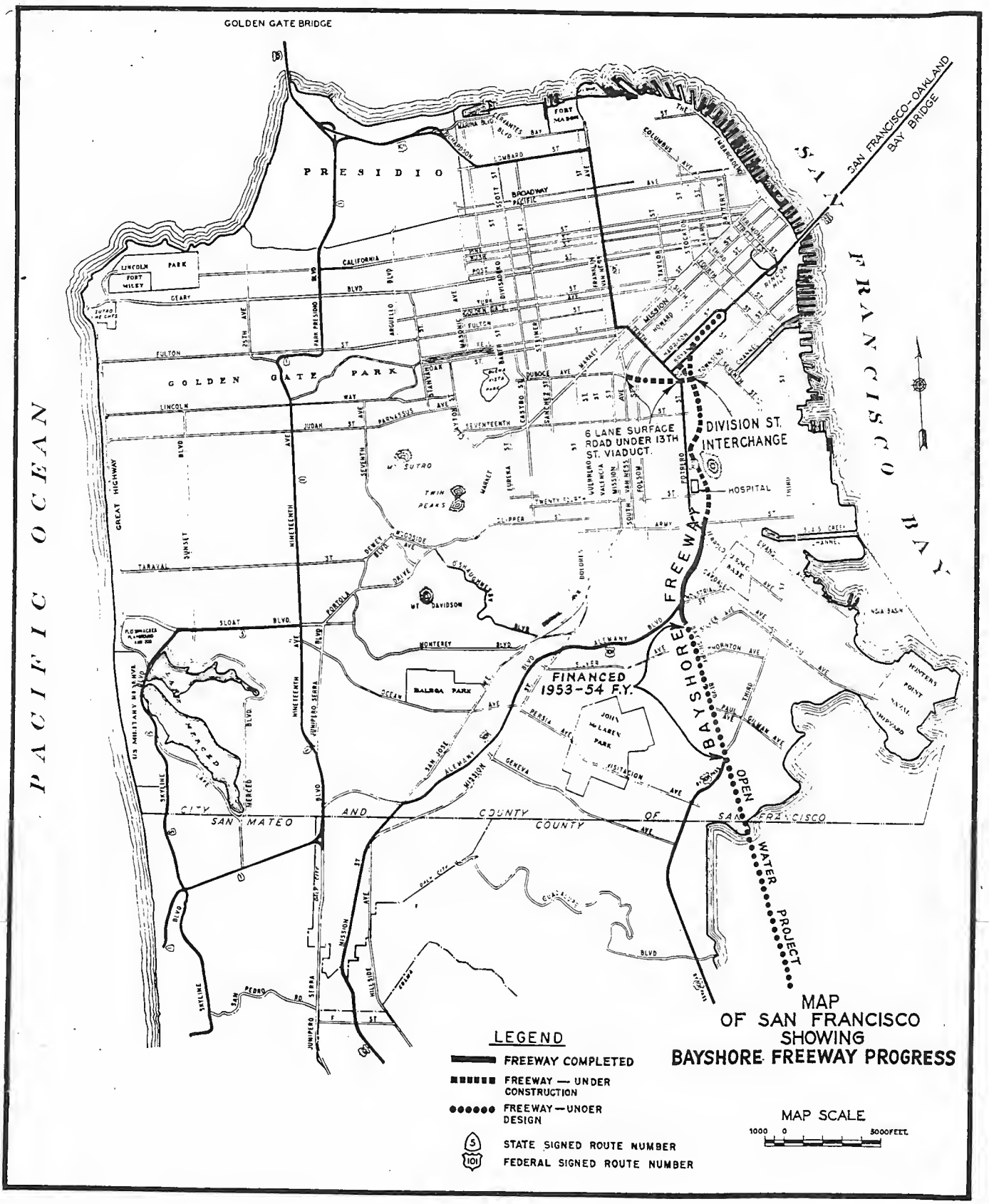
Other Units

The unit between Army Street and 17th Street is being constructed by the Fredrickson and Watson Construction Company and the M. & K. Corporation. It is 1.3 miles long and is scheduled for completion in the early summer of 1953. The construction cost will be approximately $1,600,000.

Completion of this project and opening of traffic will be coordinated with the opening of the northerly unit from 18th Street to 9th and 10th Streets at Bryant Street, thus providing the next usable unit at the same time.

Structures on this project consist of pedestrian overcrossings at 25th, 22d and 18th Streets, and a vehicular and pedestrian grade separation structure at 23d Street.

The 23d Street overcrossing is a closed abutment type structure with steel girders and a reinforced concrete deck consisting of a 42-foot roadway and two five-foot sidewalks. The nine girders required for this all-welded overcrossing consist of 50-inch by $\frac{3}{8}$-inch web plates and 16-inch by $2\frac{1}{2}$-inch


GOLDEN GATE BRIDGE
PACIFIC OCEAN
SAN FRANCISCO BAY
SAN FRANCISCO-OAKLAND BAY BRIDGE
PRESIDIO
GOLDEN GATE PARK
6 LANE SURFACE ROAD UNDER 13TH ST. VIADUCT.
DIVISION ST. INTERCHANGE
HOSPITAL
BAYSHORE FREEWAY
FINANCED 1953-54 F.Y.
OPEN
WATER
PROJECT
CITY AND COUNTY OF SAN FRANCISCO
SAN MATEO COUNTY
MAP OF SAN FRANCISCO SHOWING BAYSHORE FREEWAY PROGRESS
LEGEND
FREEWAY COMPLETED
FREEWAY — UNDER CONSTRUCTION
FREEWAY — UNDER DESIGN
STATE SIGNED ROUTE NUMBER
FEDERAL SIGNED ROUTE NUMBER
MAP SCALE
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flange plates. Each girder was fabricated and assembled in three sections in the shop, hauled to the site, welded together, and the full span of 124 feet lifted into position. The 42-foot concrete deck was placed in one continuous pour, the concrete being lifted into position by a truck crane direct from transit mixers.

Underdrains Constructed

Upon making field investigations during grading operations, and prior to embankment operations, considerable subsurface water was found at various locations throughout the project. This problem was overcome by placing perforated metal pipe underdrains and draining the water into the city storm drains. Approximately 1.7 miles of these underdrains were placed on this contract alone.

Northerly of 17th Street, the freeway is to be composed of elevated structures. Off and on ramps will connect to 9th and 10th Streets at Bryant Street, these streets being planned for one way traffic.

This project is being constructed by Charles L. Harney, Inc. It is approximately 0.7 mile long and the construction is estimated to cost approximately $3,000,000. It will serve traffic between the central portion of the downtown area and the freeway southerly of Division Street.

Connection with Bay Bridge

Also under construction is the unit between 17th Street and 7th Street. Guy F. Atkinson Company is the contractor. Completion is scheduled for early in 1954. Construction cost is estimated at $3,000,000. This is the northeasterly extension of the freeway toward its connection with the San Francisco-Oakland Bay Bridge approaches.

The separation of grades between the two foregoing units for the diversion of traffic to Bryant Street constitutes

View looking northerly across 17th Street showing steel superstructure under construction. Site of Division Street interchange in background.

View looking southerly showing freeway under construction between Bryant Street and Army Street in San Francisco. Steel for Ninth and 10th Streets off ramps in foreground. Portion of completed freeway visible in background.

a portion of the Division Street Interchange.

Also under construction is a unit providing for the interchange of traffic between the freeway south of Division Street and Mission Street via 13th Street (13th Street Viaduct). This unit constitutes two contracts both of which are being performed by Charles L. Harney, Inc. Completion of this unit is anticipated during the summer of 1954 and the estimated cost is $3,500,000. In addition to State work being performed on the elevated freeway, the city is reconstructing 13th Street on the ground level from a two-lane to a six-lane facility.

The Wye Viaduct

The final unit of the Division Street Interchange is the "Wye Viaduct" which is 0.2 mile long and is financed in the 1953-54 Fiscal Year Construction Program. Advertising for bids on this project is contemplated early in 1953. It provides an interchange for traffic between the 13th Street Viaduct and the freeway northeast of Division Street, toward the San Francisco-Oakland Bay Bridge.

The design and planning of the foregoing units encountered many difficult problems in the crossing of many railroad tracks, the bypassing of many large buildings, and also the avoiding of an interlocking tower at the intersection of the Southern Pacific and Western Pacific Railroads. These facilities could not be relocated and complete service was required to be maintained during construction.

The elevated structures composing these units are similar in design and consist of welded steel plate girders and stringers supported on reinforced concrete abutments and steel bents. The roadways vary from 26 feet to 50 feet in width.

The Division Street Interchange, when completed, will be the longest all welded highway overpass in the United States. These structures incor-

porate some of the methods of welding which were used on Germany's famed autobahns, but which have seldom been used in this country. The overhead structures and columns will contain no rivets. Accordingly, approximately 15 percent of the amount of steel ordinarily used is saved. Also, undetermined amounts of time and money in fabrication and erection are saved. Due to the importance of the welding, all welders are subjected to tests by the State. As a further precaution, completed welds are X-rayed so that possible defects are determined and corrected.

Major Items

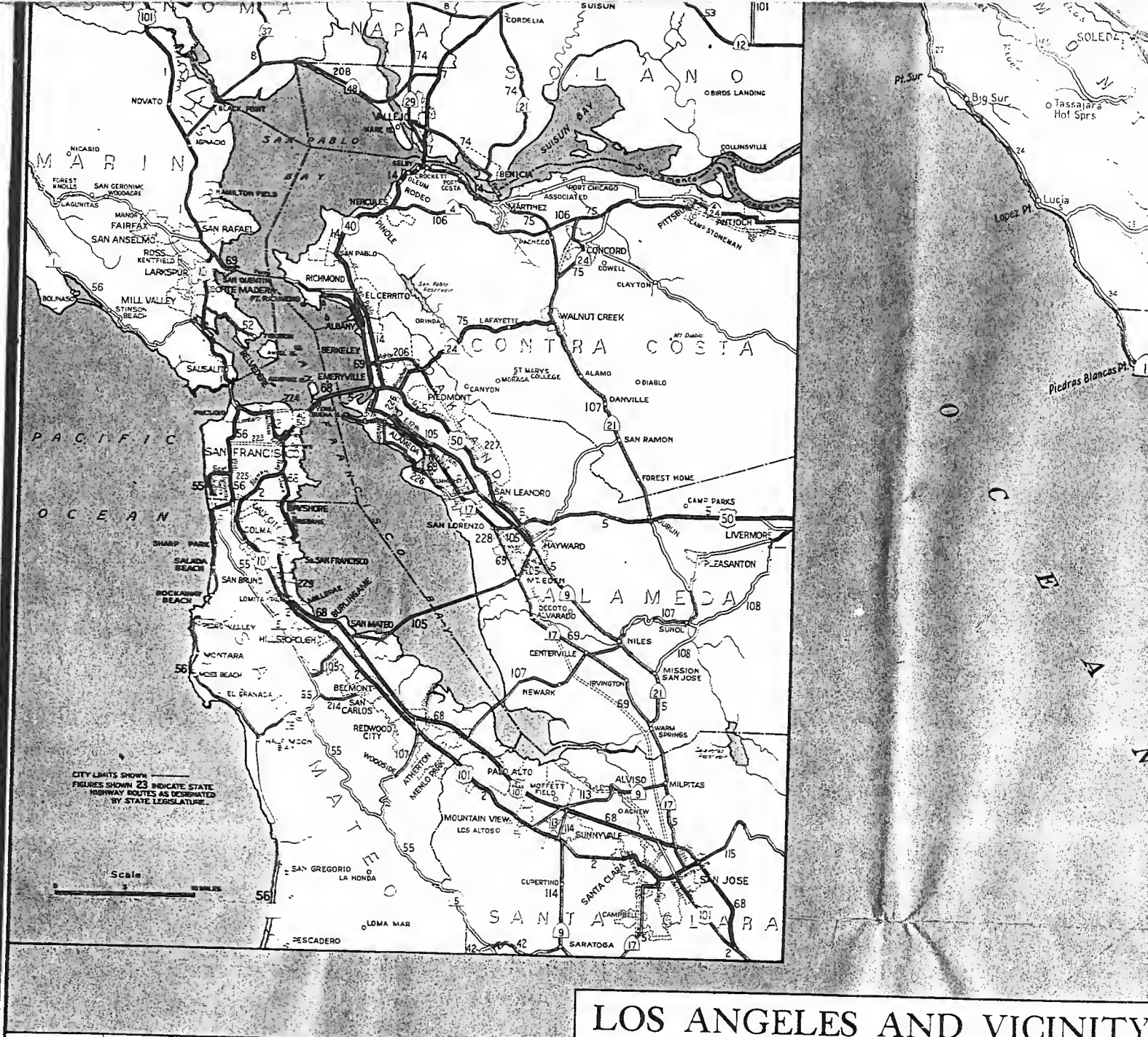
An appraisal of the magnitude of the work now under way may be obtained from the following tabulation of the approximate contract quantities of some of the major items involved in the several projects now under construction.

Concrete removal	40,000 cubic yds.
Roadway excavation	442,000 cubic yds.
Structure excavation	80,000 cubic yds.
Cl. "A" portland cement concrete	33,000 cubic yds.
Structural steel	37,000,000 lbs.
Piles	210,000 lin. ft.
Reinforcing steel	4,660,000 lbs.
Misc. iron and steel	323,000 lbs.

Resident engineers in charge of construction engineering on the aforementioned projects are G. W. Thompson for the bridge work and W. C. Hite for the road work.

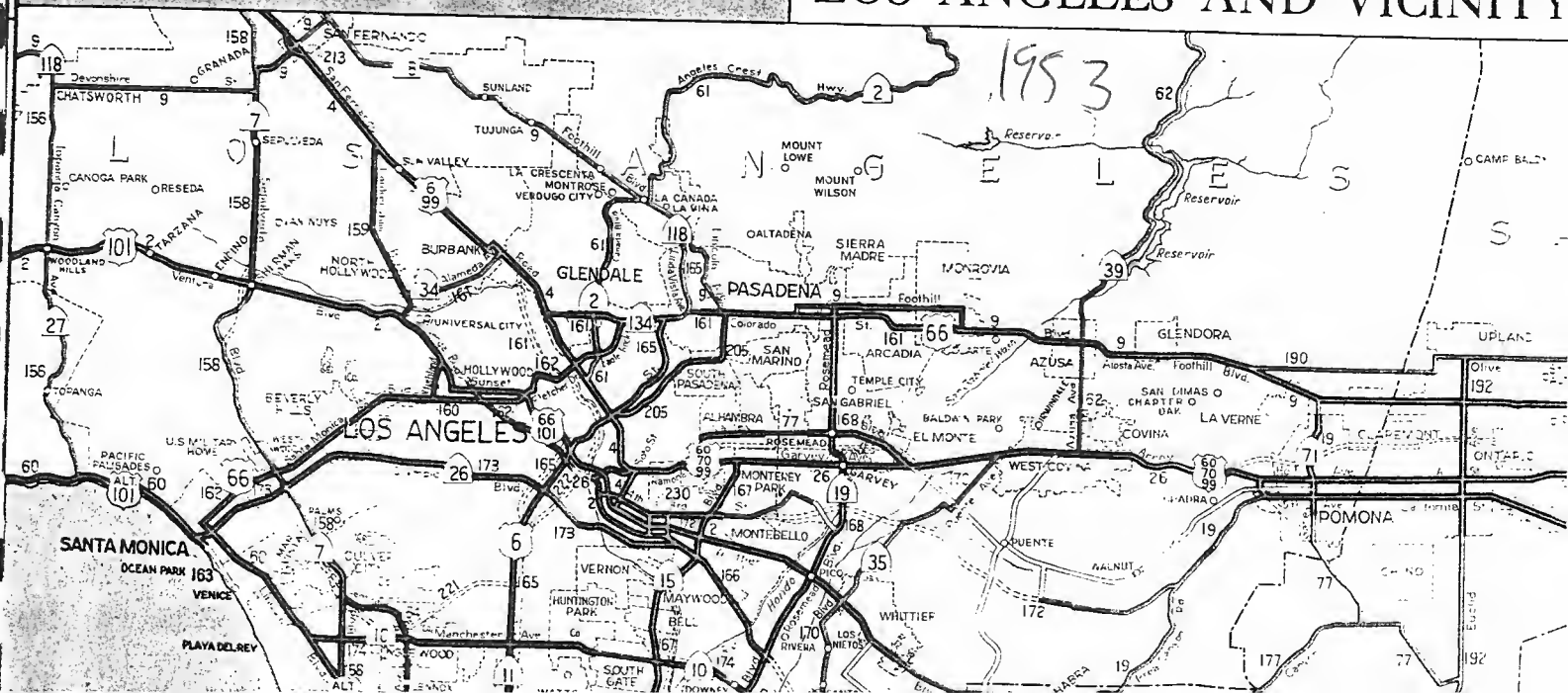
The bridge work is under the general supervision of Assistant State Highway Engineer F. W. Panhorst and the road work and right of way acquisition and clearance under the general supervision of Assistant State Highway Engineer B. W. Booker.

Looking northerly from Army Street showing progress of freeway construction from Army Street to 17th Street. Twenty-fifth Street pedestrian overcrossing and 23d Street vehicular overcrossing visible in foreground. Steel viaduct construction now in progress is visible in background.

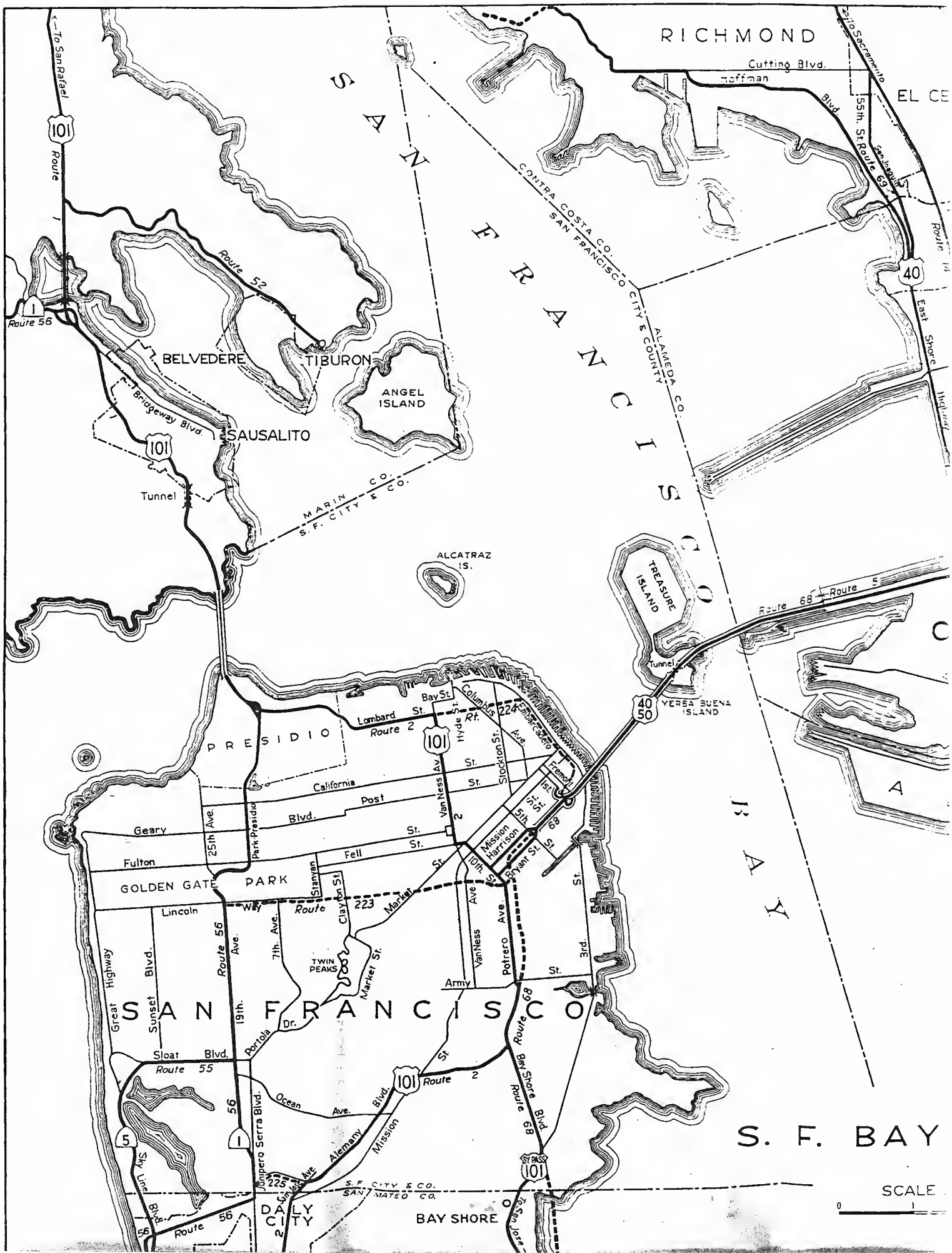


LOS ANGELES AND VICINITY

1953



1953



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CONTRA COSTA CO.
SAN FRANCISCO CITY & COUNTY
ALAMEDA CO.
To San Rafael
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Route 1
Route 56
Route 52
BELVEDERE
TIBURON
ANGEL ISLAND
Bridgeway Blvd.
SAUSALITO
Tunnel
MARIN CO.
S.F. CITY & CO.
ALCATRAZ IS.
TREASURE ISLAND
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Route 5
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YERBA BUENA ISLAND
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PRESIDIO
Lombard St.
Route 2
Bay St.
Columbus Ave.
Embarcadero
Hyde St.
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California St.
Post St.
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Fell St.
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Army St.
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Sep- Oct 1953

Bayshore Freeway

New Section Between Army and Bryant Opened to Traffic

A NEW TWO-MILE section of the Bayshore Freeway between Army Street and Bryant Street in San Francisco was opened to traffic on October 1st.

The completed project, representing two separate contracts, has taken two years to construct.

The first contract, awarded in August of 1951, covered the construction of seven-tenths of a mile of six-lane divided freeway between 18th and Bryant Street. All of this section of the Bayshore is elevated some 20 feet above ground level.

The second contract, on which work began in March, 1952, covered the 1.3 miles between Army Street and 17th Street. In addition to construction of the freeway itself, this project also involved the construction of pedestrian overcrossings at 25th, 22d and 18th Streets and a 122-foot bridge to carry cross traffic and pedestrians over the freeway at 23d Street.

Right of Way Costs

Nearly half of the over-all $9,312,000 cost of the two projects was for the purchase of right of way, involving the extensive removal or relocation of major public utilities facilities such as railroad tracks, sewer lines, water mains and power and telephone installations.

One of the most difficult problems was the relocation of certain City of San Francisco high pressure water lines which are used exclusively for fire protection. The work involved careful planning, because the water could be shut off for short periods only on account of the fire hazard.

Opening of the Army-Bryant section will mean an unbroken stretch of freeway between Alemany Boulevard and Bryant Street, a distance of three miles. It will liberate thousands of motorists from the congestion which has prevailed on Potrero Avenue.

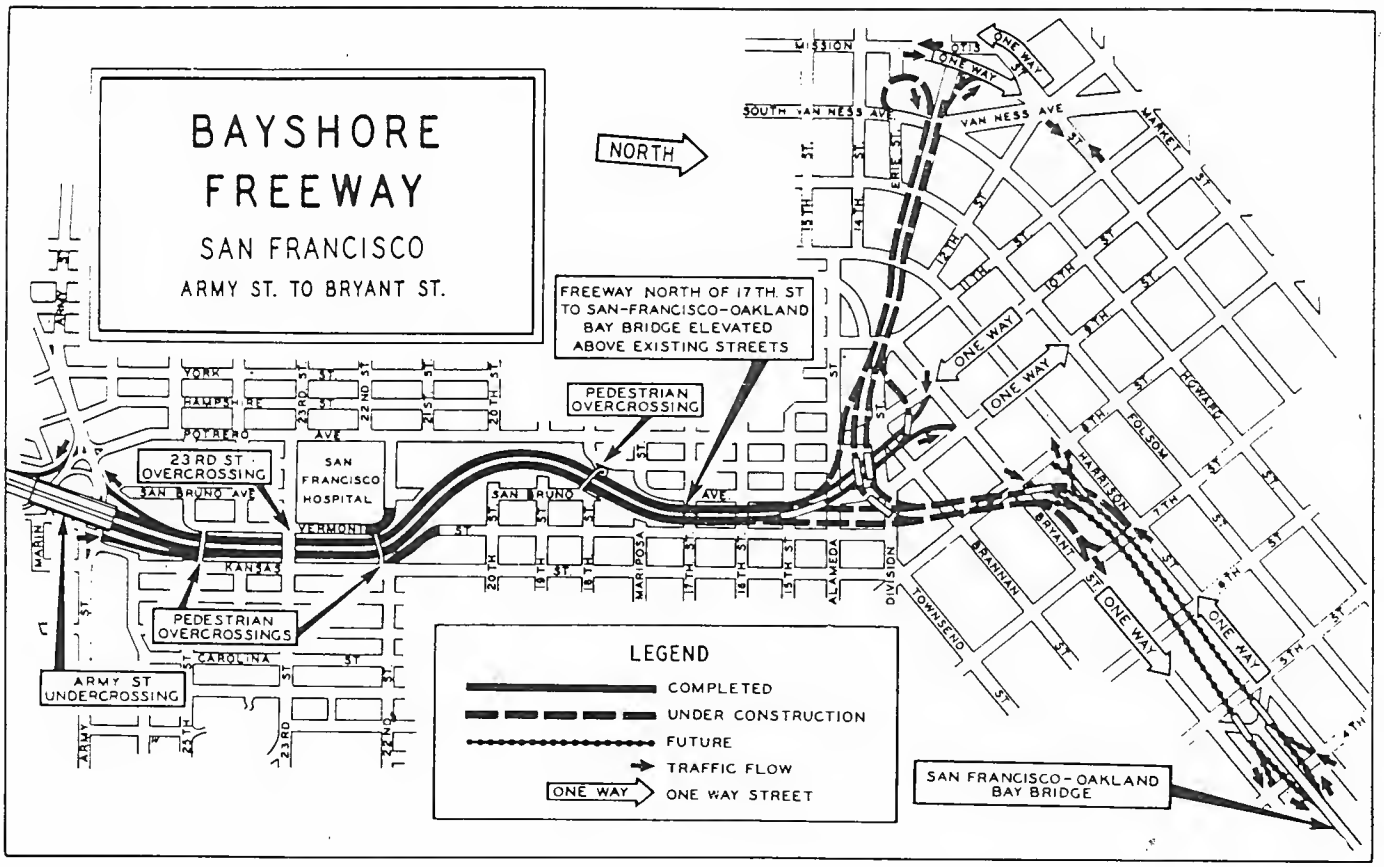
Three Other Contracts

The 1.7-mile section from Alemany Boulevard south to Third Street is now under construction and is slated to be completed sometime early in 1955.

Three other contracts, now in progress, will extend the freeway viaduct north to Seventh Street and west along 13th Street to Mission Street.

In addition, bids will be opened on September 30th for construction of most of the remaining portion of the

. . . Continued on page 56



to drive all piles to at least the planned penetrations.

The deck of the new bridge is carried by two lines of riveted steel plate girders, five feet deep, spaced 20 feet center-to-center. There are 12 spans: the abutment spans are 67 feet long and interior spans 80 feet. The girder support system is one of overhanging spans alternating with suspended spans simply supported on hinges by the overhangs.

Besides highway traffic, Willard Bridge carries many utility conduits including local gas, water, telephone services, crude oil and natural gas long range transmission lines. These all had to be transferred to the new structure by their owners during construction operations of the bridge contractor. Heavy rock riprap protection of the riverbanks was incorporated into the bridge contract.

Cost of Span

The total cost of the contract work exclusive of engineering was $435,887.13, the bridge itself costing $371,675.67. To finance the project Ventura County drew on federal aid secondary funds totaling $269,550 plus state matching funds from the County Highway Aid Act of 1945 in the amount of $68,120.65. The balance of the matching funds was furnished by the county. The contract was administered by the Bridge Department of the Division of Highways, of which F. W. Panhorst, Assistant State Highway Engineer, is Chief. W. B. Piper served as Resident Engineer during construction of the foundations and piers, the writer on the superstructure and the major portion of the approach work. Survey parties and most of the assistant resident engineers came from the Ventura County surveyor's office. Robert L. Ryan is county surveyor. Walter K. Loban was assigned to the job for the entire construction period.

O. B. Pierson of Bellflower was general contractor, represented on the job by L. P. Cortner, superintendent. Several subcontractors were employed, notably the Union Steel Company of Los Angeles, in whose shops the girders were fabricated and whose forces erected and riveted the steel on the job.

1953 Highway Dodgettes Girls' Softball

Here are members of 1953 Highway Dadgettes girls' saftball team. TOP ROW—Ann Pratt, manager; Velara Meredith, pitcher; Dick Stedmen, assistant manager; Carmen Nordgreen, catcher. MIDDLE ROW—Merry Lau Johnsan, shartstap; Geargia Ann Stedmen, right field; Wilma Butz, center field; Virginia Emick, third base; Bertha Fuller, catcher. FRONT ROW—Ann Puccinelli, second base; Margaret Peugh, first base; Hazel Blair, left field; Marjorie Baland, shartstap. Sarah Durrill, right field, and Camille Brawn, secand base, are nat in phata.

Bayshore Freeway

Continued from page 44 . . .

freeway between Seventh Street and the San Francisco - Oakland Bay Bridge.

This project, which covers construction of a viaduct and ramps between Eighth Street and Fourth Street, will be the next to last step in closing the gap between the Bayshore and the bridge. The job will be financed by a $4,500,000 allocation added to the State Highway Budget for the 1953-54 Fiscal Year when the budget was revised in July by the California Highway Commission following enactment of legislation increasing highway user taxes.

Final Construction

One more contract, covering the Fourth to Third Street section and the connecting structures with the Bay Bridge and the proposed Embarcadero Freeway, will complete the connection.

The final construction to be done on the Bayshore Freeway in San Francisco will consist of a one-mile section from Third Street to the south city limits, which will connect with a fill, a portion of which is presently under construction, extending from Candlestick Point across open water of the bay, to a junction with completed freeway in South San Francisco.

The San Francisco Chamber of Commerce held opening ceremonies for the Army-Bryant Street section on October 1st.

First portion of the Bayshore within the City of San Francisco was officially opened to traffic on June 1, 1951. This was the unit extending from Alemany Boulevard to Army Street.

Nov - Dec 1953

ANOTHER UNIT OF BAYSHORE FREEWAY IS OPENED

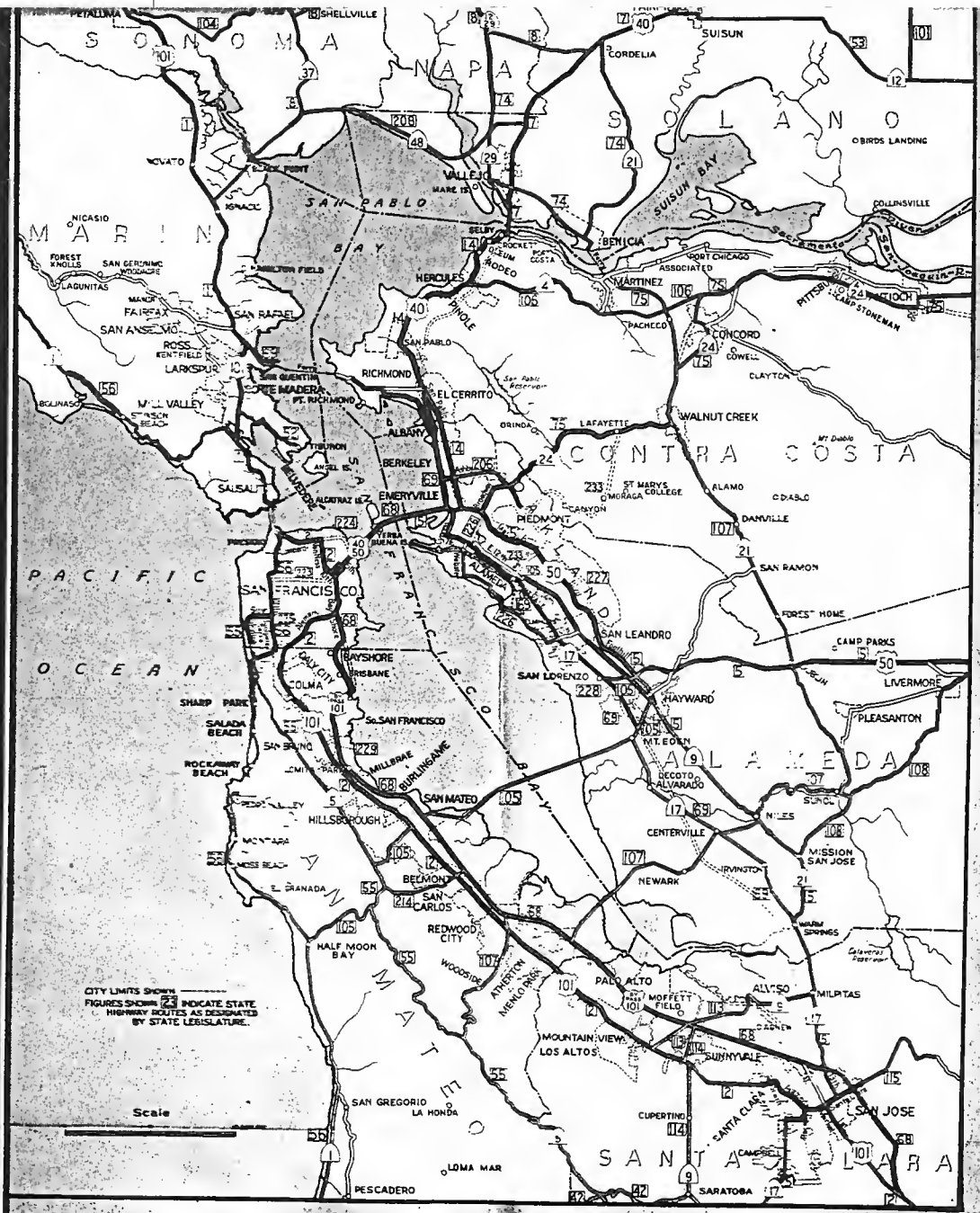
On October 1, Director of Public Works Frank B. Durkee joined with Mayor Elmer Robinson of San Francisco in severing with a blow torch a chain stretched across the Bayshore Freeway, signalizing the opening of a new two-mile section of the freeway between Army and Bryant Streets in the Bay city.

The upper photo is an aerial view looking northeasterly across San Francisco. The 18th Street pedestrian overcrossing over the Bayshore Freeway in center foreground. Ninth and Tenth Street connections at left. San Francisco-Oakland Bay Bridge, Yerba Buena Island and man-made Treasure Island in upper right.

The lower picture shows Durkee, right, with Mayor Robinson on the left, cutting the ceremonial chain.

BELATED SAFETY CURES

Those who disregard health rules contract serious ailments and suddenly become desperately aware of the need for a cure. Drivers who disregard safety rules sooner or later become involved in serious accidents and then suddenly become desperately aware of the necessity of traffic safety rules and practices.



LOS ANGELES AND VICINI

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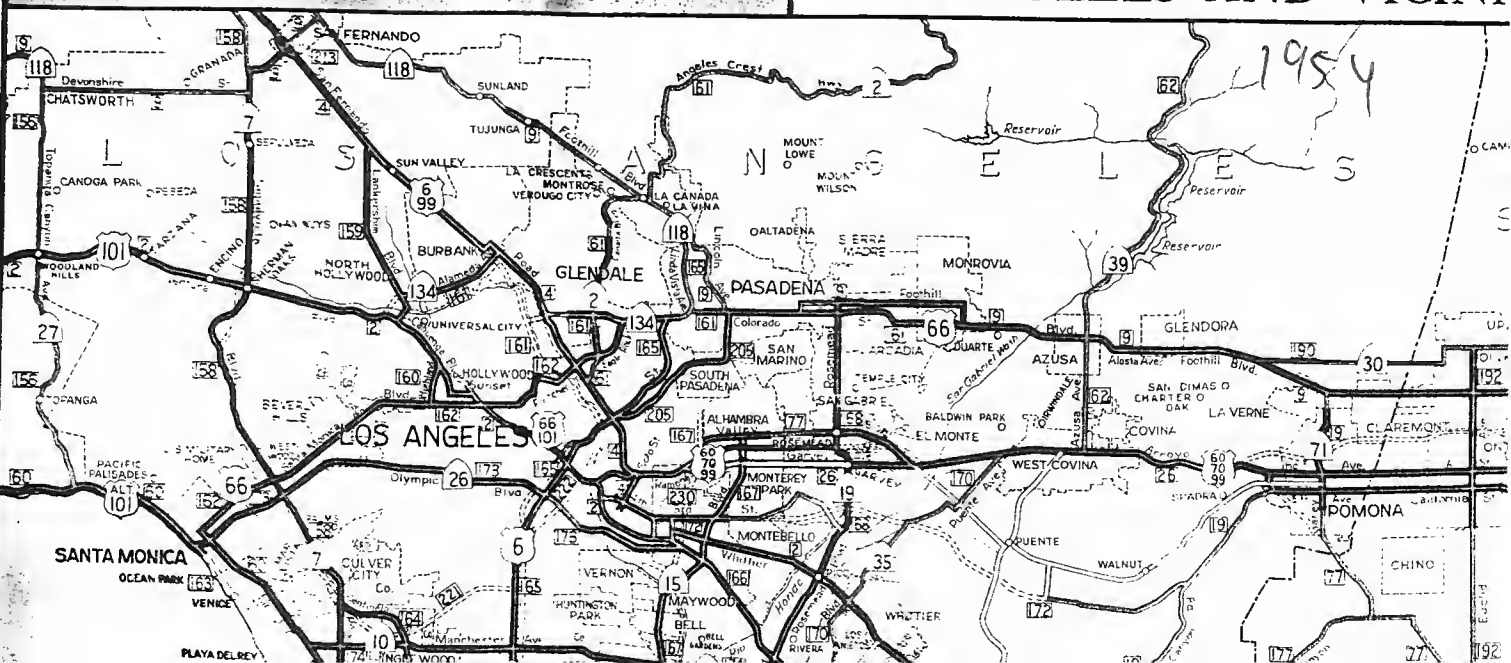

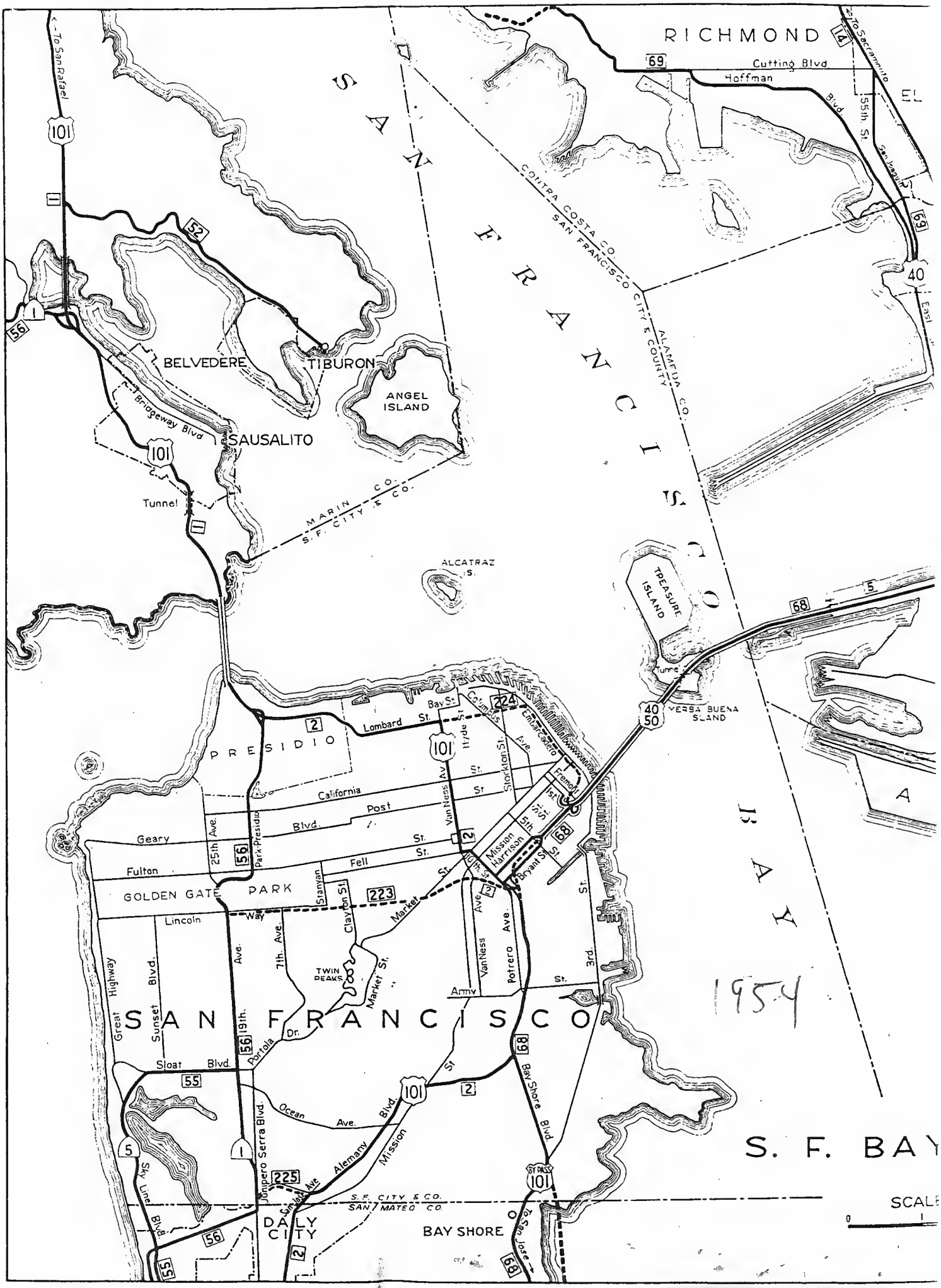
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YERBA BUENA ISLAND
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Sky Line Blvd.
Alemany Blvd.
Mission St.
Bay Shore Blvd.
Cambon Ave.
S.F. CITY & CO.
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DALY CITY
BAY SHORE
To San Jose
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Mar - Apr 1954

Bay Area Freeways

By B. W. BOOKER
Assistant State Highway Engineer

Multi-million Dollar Program Of Construction Under Way

STRIDES which have been made in the construction of freeways in the metropolitan area of Los Angeles and vicinity were reported in the January-February issue of *California Highways and Public Works*.

In the major metropolitan district comprising the nine counties in District IV in the San Francisco Bay area, a similar effort to improve highway transportation for a large segment of California's population has and is being made.

Previous reports on the completion of the various important freeway projects have been confined generally to individual contracts or groups of related contracts, resulting possibly in an impression of disjointed progress. To meet particular and pressing needs, and in apportioning available funds, small sections of freeway appeared in a manner which may have indicated no comprehensive plan.

B. W. BOOKER

Seventh Year of Program

In this seventh year of construction, and with the aid of further funds, acceleration in the program is unfolding the planned continuity of the system. Short stretches of freeway have expanded to long avenues of modern highway and loose ends are gathered into connected thoroughfares.

The geography of the Bay area imposes severe restrictions upon the design of a freeway system. In connecting the cardinal points of the district, traffic must be funneled into the existing crossings of the extensive bay waters. Further, the primary function of any system of transportation in this area must be the movement of workers from suburban homes to occupational centers. It necessarily follows that points of convergence are in the heavily populated sections of San Francisco and Oakland, presenting a problem in costly right of way, the acquisition of which must conform to the principle of minimum disturbance of established interests consistent with maximum benefit. Thus, it is that the progress of a metropolitan freeway system is governed to a large degree by our ability to purchase right of way and the acceptance by the public of the location and extent of the facility.

Right of Way Acquisition

In a successful effort to expedite the purchase of right of way, the 1952 Session of the Legislature provided funds for advance acquisition of right of way on highway routes through areas of potential or imminent development. Saved for construction will be millions of dollars of future funds which would have beeen expended on homes and industrial plants, the building of which can now be kept from the path of planned routes. Further aid was provided by the 1953 Legislature, which increased the advance right-of-way acquisition fund from $10,000,000 to $30,000,000 and at the same time made it a revolving fund. Additional construction revenue was provided by increasing the gasoline tax to 6 cents per gallon, with the other highway user taxes increased in proportion.

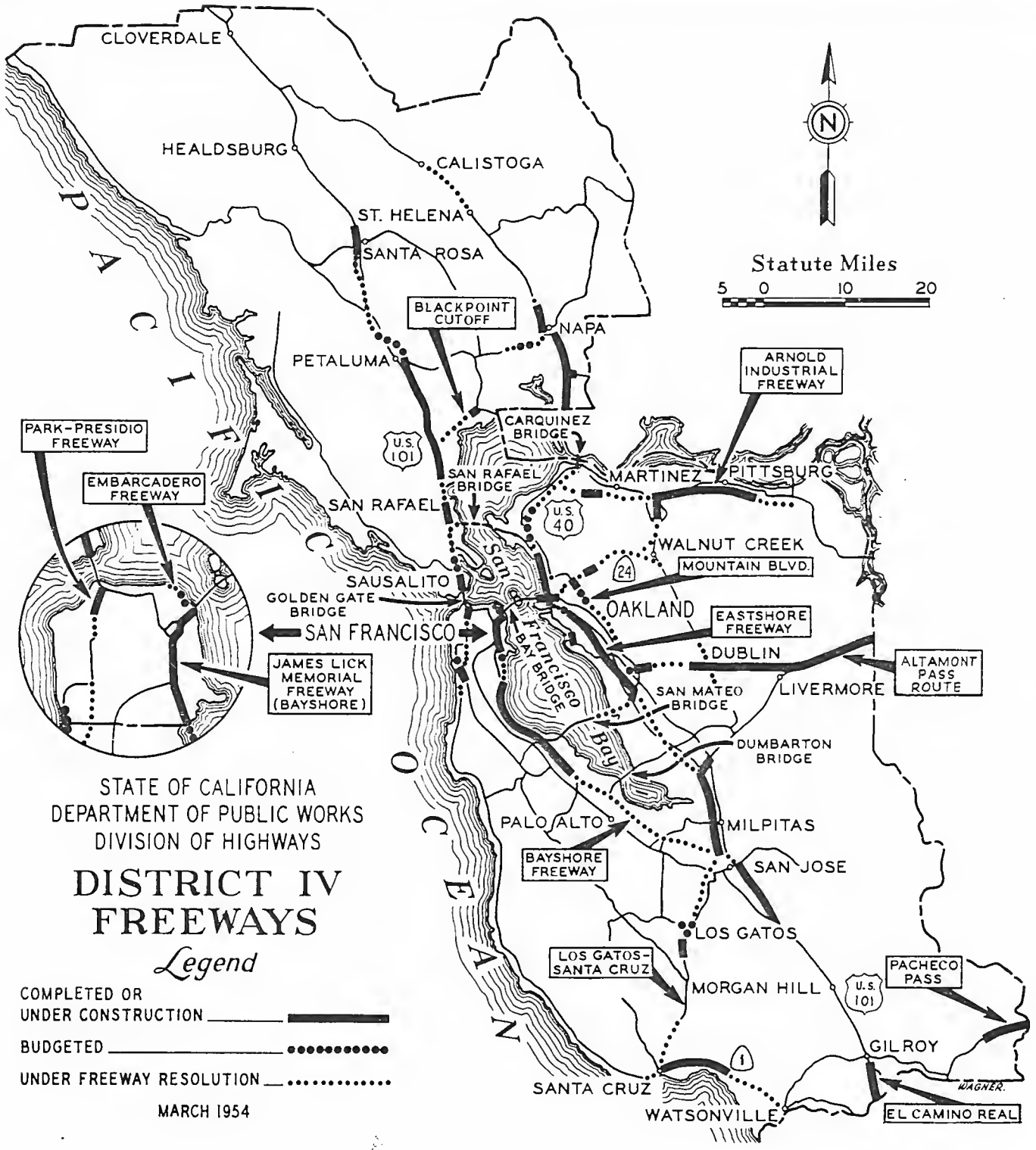
New funds pravided by additianal highway taxes have praduced discernable pragress taward an integrated freeway system. The flaw af vehicular travel thraughaut the area already reflects the patentials of madern highway engineering. Full effect af the accelerated pragram is yet ta be felt. The next few years should witness great strides farward in praviding a warkable measure af madern raads capable af sustaining rapid and canvenient mavement between residential and accupatianal centers of the Bay area.

The story of progress since the laying of the cornerstone is told in the development of the routes which are designated by the California Highway Commission as freeways.

The accompanying map and tabulation showing status of District IV freeway projects indicate in a general way the progress that has been made. To date, a total of 140 miles of freeways and expressways have been completed in District IV and 36 miles are under construction.

The total sum that has been expended for completed freeways, freeways in progress, and right-of-way acquisition therefor, is $195,000,000.

The budget for the 1954-1955 Fiscal Year which has been adopted by the California Highway Commission, allocates a total in excess of $48,000,000 for expenditure upon District IV freeways, which will add 25 miles of multilane urban freeways and intercity expressways to the highway system in this district.



Thus the total expended and obligated for District IV freeways is $243,000,000 which amount will provide over 200 miles of modern highway transportation facilities in the San Francisco Bay area.

Brief description of the status of each of the District IV freeway projects follows:

BAYSHORE FREEWAY

The Bayshore Highway was originally constructed to relieve the mounting pressure on the El Camino Real. A part of the historical route of the Padres, this north-south route along the bay side of the peninsula not only approached its physical limitations but fell victim to strangulation through

roadside development, and finally assumed, to all intents and purposes, the characteristics of a city street.

For many years the Bayshore Highway, known also as US 101 (Alternate), served its purpose well. Carrying through inter- and intrastate traffic, commuter traffic between residential San Mateo Peninsula and San Francisco, and commercial traffic between the industrial centers of the metropolitan area, this primary route soon indicated the need of a freeway development. Its alignment, generally easterly from the peninsula cities, lent itself with few modifications to freeway transition.

The initial project to be completed as a modern freeway, a short section between Broadway in Burlingame and Peninsular Avenue in San Mateo, was finished in 1947. Constructed as a full freeway, this original link provided controlled access, grade separations and outer highways serving as frontage roads.

Projects Completed

The years 1948 and 1949 witnessed the completion of two contracts involving the South San Francisco and the South San Francisco to Burlingame sections. This completed the full freeway in the vicinity of the San Francisco Municipal Airport, the expansion of which necessitated major changes in highway alignment to the west.

At this point in the development of the Bayshore Freeway the scene shifts to the City of San Francisco where a $6,000,000 mile-and-one-third was completed in June, 1951. In October, 1953, the northerly continuation of the original section was opened to traffic. Traversing a two-mile alignment, 0.7 miles of which is elevated structure, this link connects the Army Street interchange with the freeway off ramps at Bryant Street. This section and the acceptance of the Peninsular Avenue to 16th Avenue project in San Mateo represent the to-date

View of portion of San Froncisco looking toward the Bay Bridge and the East Bay, showing freewoy units under canstruction or yet to be constructed. The loop in the lower foreground shows where the 13th Street connection off-romp will meet South Van Ness Avenue. On- and off-romps at Eighth Street ore shown in the left center of the picture.

Central portion of San Francisco, showing Bayshore Freeway construction extending toward connection with Bay Bridge

completion of the Bayshore Freeway, totaling 14.4 miles in length.

As in all such construction the early stages appear to be a disjointed approach to the problem, but with passage of time a positive pattern appears. Under way and scheduled for early completion are projects which will provide further continuity to the freeway, creating an uninterrupted full freeway facility from San Carlos to the San Francisco-Oakland Bay Bridge, a Bay fill operation between Candlestick and Sierra Points, with the exception of the "Open Water Project."

Projects Now Under Way

The projects now in various stages of construction briefly listed are the Alemany-Third Street section in San Francisco, 1.7 miles in length and scheduled for completion early in 1955; the 16th Avenue, San Mateo, to San Carlos section to be completed late in 1954; and four contracts in San Francisco extending the elevated freeway from the Division Street Wye easterly to Fourth Street and westerly to Mission Street via 13th Street. Bids are now being called for the connecting link to the Bay Bridge, including integrated structures which will provide a take-off for the Embarcadero Freeway.

Construction on the remaining unit on this route in San Francisco, a 0.7-mile section from Third Street to the San Mateo County line, which will connect with the open water fill, will also be started this year.

The total cost of the 6.4 miles of the Bayshore Freeway in San Francisco will amount to $44,000,000, while the entire facility from San Francisco to San Jose, some 48.8 miles in length, will represent an expenditure of approximately $111,000,000 when completed. Traffic count on the route near the San Francisco end is 61,000 vehicles per day.

EASTSHORE FREEWAY

Freeways have taken names, usually of local origin, and these are often lacking in full definition. The limits of the Eastshore Highway were Richmond on the north and San Jose on the south. As signed, the route was mainly State Sign Route 17, a section along the bay between Emeryville and

Richmond being US 40. In its transition to a freeway, Sign Route 17 has left most of its former locale, with a new alignment completely replacing its southerly meandering.

The first completed section of the southern portion of the freeway was opened in July, 1949. Starting at Fifth and Oak Streets, the six-lane full freeway carried traffic to the vicinity of 23d Street. By June, 1950, use of the freeway was available to 98th Street. In July of 1952, a further 4.2 miles carried the freeway to Lewelling Boulevard to San Lorenzo. One more year produced the 3.9-mile section to Jackson Street in Hayward.

While construction proceeded southerly from central Oakland, a 9.85-mile unit was advancing northerly on a completely new alignment between San Jose and Warm Springs. The first section to Trimble Road was completed in August. 1953, and the second section, 8.1 miles to Warm Springs, is scheduled for completion in the summer of 1954.

Posey Tube Overcrossings

The opening of the Alameda (Posey) Tube Overcrossings in Oakland February, 1954, marks the initial step in connecting the completed portions of the freeway with the San Francisco-Oakland Bay Bridge and with the Eastshore through Oakland. Berkeley and beyond.

Currently under construction are the third level additions to the Bay Bridge Distribution Structure and two adjoining sections along the Bay to the north. One, due for completion in July, 1954, falls within the limits between the distribution structure and Ashby Avenue, and the other continues this latter section to the Albany Overhead, to be completed next year.

Thus we have an unhampered flow of traffic through the congested 16-mile industrial section between Hayward and Oakland. The large volume of traffic formerly passing through the city streets of Oakland, San Leandro and Hayward which presently amounts ot a maximum of 65,000 vehicles per average day, now rolls through the open freeway in a matter of minutes.

Boyshore Freewoy in Son Froncisco; Army Street interchonge ot bottom; Alemony Boulevard interchonge, center; with section presen', under construction between Alemony Boulevard and Third Street extending to upper left*

View of construction progress on Bayshore Freeway in San Francisco from Third Street looking toward Alemany Boulevard

The Eastshore Freeway when completed will be 55.7 miles in length. Expenditures on this route for right-of-way acquisition and for construction of the 30.1 miles which are built or under contract, total $59,000,000.

US 101-GOLDEN GATE BRIDGE TO SANTA ROSA

Pressing toward the immediate goal of a through freeway from the Golden Gate Bridge to Santa Rosa, a major job on the Waldo Grade is now in progress, and a bridge with approaches at Petaluma Creek is well under way.

The first section was built as a controlled access facility, being completed in August of 1947. This $1,700,000 project provides for four lanes of divided highway covering the 12 miles between Petaluma and Ignacio. In 1949 the 4.3-mile Santa Rosa Bypass was completed as an expressway.

Late in September, 1952, a unit 5.4 miles in length between the Forbes Overhead and Ignacio was added to the previous section, making a continuous 17-mile run of limited access freeway from Forbes to Petaluma.

In October of 1953 one further step was taken in the transition to freeway. The six-lane divided highway between California Park and the San Rafael Viaduct was completed as a full freeway, with frontage roads, and an interchange structure at San Quentin Wye designed to serve the building San Rafael-Richmond Bridge. This section, together with the completion of the San Pedro Road undercrossing at Puerto Suello Hill, extends freeway continuity through the 22 miles between San Rafael and Petaluma.

Currently building, the four-mile section of full freeway between Golden Gate Bridge and Manzanita is scheduled for completion late in 1954 or early in 1955. The Golden Gate Bridge and Highway District is contributing $5,000,000 to this project. This six-lane facility involving a 1,000-foot tunnel, two side-hill structures each approximately 300 feet and four vehicular interchanges, will provide smooth flow for upwards of 30,000 per day load which traverses the grade.

Further progress toward Santa Rosa is indicated by the advertising for bids for the Petaluma-Stony Point job, an 8.2-mile section extending northerly from Petaluma Creek which includes four complete interchange structures. The outstanding feature of the job for which $4,713,000 has been budgeted, is the bypassing of traffic around Petaluma, whose citizens 20 years ago little dreamed that they would look toward this.

In Marin County another link in the freeway will be a new six-lane divided bridge across Richardson Bay for which $3,000,000 has been provided in the 1954-1955 budget by the California Highway Commission. Thus with a cost of $17,500,000 for sections already completed and under contract, a total in excess of $24,000,000 has been spent or obligated for this freeway.

BLACK POINT CUTOFF

Except for improved alignment through a hill at Black Point and another at Sears Point, this freeway follows the location of the original Black Point cutoff which was completed in 1918 to provide a direct route from the Bay area to Sonoma and Napa Valleys.

Extending from Ignacio to Sears Point, the grading has already been completed and the cut sections have been paved to eliminate the deficient portions of the alignment. At Sears Point a section 0.7 mile in length was completed in 1950 as a four-lane divided facility.

Finishing of the full facility which will require a new bridge across Petaluma Creek at Black Point as well as other structures and paving await the availability of funds. In the meanwhile, the embankments across marsh lands for the future additional lanes which were overloaded to accelerate settlement, have subsided approximately two feet. It is expected that further settlement will be only nominal, thus insuring a stable roadbed when final construction is undertaken.

The amount expended for right of way for this 7.3-mile freeway and for the initial work is $1,200,000.

View showing progress of groding operotions for Skyline Boulevard from Edgemar Road to junction of Routes 55 and 56 in Daly City

UPPER—Boyshore Freewoy in Son Mateo, looking south fram vicinity of Third Avenue interchange. LOWER—Bayshore Freewoy through Burlingome, looking north fram vicinity af Peninsulor Avenue interchange.

NAPA AREA

The City of Napa is served by two major highways, one Sign Route 29, generally north and south, and Sign Route 37, generally east and west. Both routes traversed narrow and irregularly patterned streets in passing through the city. The impetus on traffic of the wartime activity at Mare Island necessitated the improvement of the route from Vallejo to Napa as an emergency measure. The most critical section was developed as an expressway in 1944 and the remaining portions were finished in 1949 to pro-

vide a continuous facility 12 miles in length through Napa County.

In September, 1950, two lanes constituting stage construction of a three-mile section of controlled access freeway was completed joining Routes 37 and 29 on an alignment westerly from the city. It is interesting to note that the 1953 count during 16 hours on Sunday, July 12th, shows 9,562 vehicles using the freeway. In the absence of this facility these vehicles would have saturated the streets of Napa, formerly included in the highway system.

To date $2,150,000 has been expended on stage construction of 14.6 miles of this rural type of expressway.

US 40-RICHMOND TO CARQUINEZ

This freeway has been laid out to bypass the built-up communities between Richmond and the Carquinez Bridge. Located generally easterly of existing US 40 on a more direct alignment the 13.8 miles which comprise this route is largely in the design stage. The planned improvement contemplates elimination of the sharp curve at the south end of the bridge and makes provision for a connection to a parallel structure which is proposed for construction 200 feet upstream from the present crossing.

At the Richmond end of the freeway, two structures for the initial unit are now being built, one over the Santa Fe tracks at 47th Street and one over San Pablo Creek. A contract to complete the 4.7-mile initial section is due for advertising this year, which will involve an expenditure of approximately $6,000,000.

The cost of the structure contract and right of way that has already been acquired represents another $4,000,000.

ARNOLD INDUSTRIAL FREEWAY

The Arnold Industrial Highway in Contra Costa County, as an east-west thoroughfare which is signed as Route 4, originates in a junction with Route US 40 at Hercules. After traversing the low hills of western Contra Costa County it serves the industrial centers of Martinez, Port Chicago, Pittsburg, Antioch and proceeds easterly toward Stockton.

Its development as a freeway followed the dictates of the traffic pattern, the first section resolving the congestion in Willow Pass, where the vehicular flow from the south and from the west merges on its way to the industrial area and beyond. This original section was completed in 1947, its easterly limit being Port Chicago Road.

Construction operations showing widening of Woldo Grade, looking sauth taword Golden Gote Bridge

Similar construction, permitting controlled access, continued the freeway to Railroad Avenue in Pittsburg, this 4.5-mile section assuming a completely new alignment immediately south of the congested industrial area. Following this new alignment, a five-mile section which carries the freeway from Pittsburg to "A" Street in Antioch was opened July 1, 1953. The Barry Hill line change from Christie Underpass to Glen Frazer which was finished in 1949 completes the current development, which includes 13.8 miles of the 53.2 miles which have been declared a freeway. The expenditures for the finished sections of four-lane expressway total $5,800,000.

OAKLAND-WALNUT CREEK-CONCORD

The main approach to the East Bay metropolitan area is Sign Route 24. This facility, known as Tunnel Road from its passage through the Broadway Low Level Tunnel, carries a daily traffic load of over 38,000 vehicles. In addition to accumulating traffic from through easterly routes in Contra Costa and Alameda Counties, the

Redwood Highway looking north toword San Rofael from vicinity of California Park Wye

road serves a vast area of suburban population employed in the business and industrial centers of the East Bay.

The Tunnel Road, running easterly from the Broadway Tunnel and turning northerly at Walnut Creek to merge with the Arnold Highway, has been declared a freeway in its entirety. The present road has been confined by a strip development requiring practically complete realignment and an unusually large number of grade separations.

One section 2.3 miles long, from Concord to the Arnold Industrial Freeway, was completed in January, 1947. Work was recently assumed at Orinda Junction on a 1.2-mile unit, where Moraga Road makes a direct crossing of Route 24. This project which includes a complete interchange with a construction cost of $1,570.000 is scheduled for completion in May, 1955. While $2,700,000 has been spent for right of way, with considerable acquisition for future units, the construction of additional sections of the freeway awaits the availability of funds.

MOUNTAIN BOULEVARD

The improvement of Mountain Boulevard to freeway standards has been planned to provide better accessibility for the residents of a large section of Oakland lying on the west slope of the range which separates the Counties of Alameda and Contra Costa. The 9.3 miles which comprise the total length of this route from Lake Temescal to San Leandro are covered by freeway resolution.

A 1.1-mile section near Lake Temescal was completed in January, 1952, at a cost of $1,800,000 and an additional one-mile unit will soon be scheduled for construction.

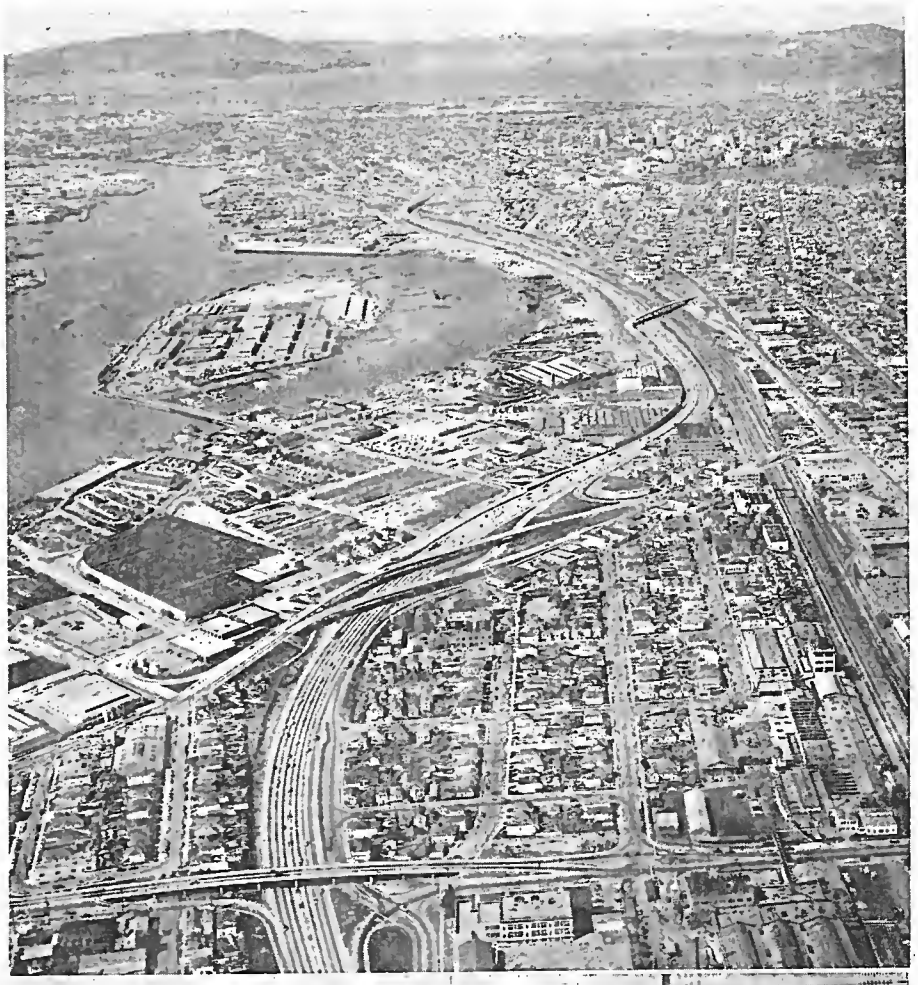
Joint Highway District 26 was organized in 1938 to accomplish the construction of this road, with Alameda and Contra Costa Counties joining with the Division of Highways as members, and with the City of Oakland also participating in the cost. The

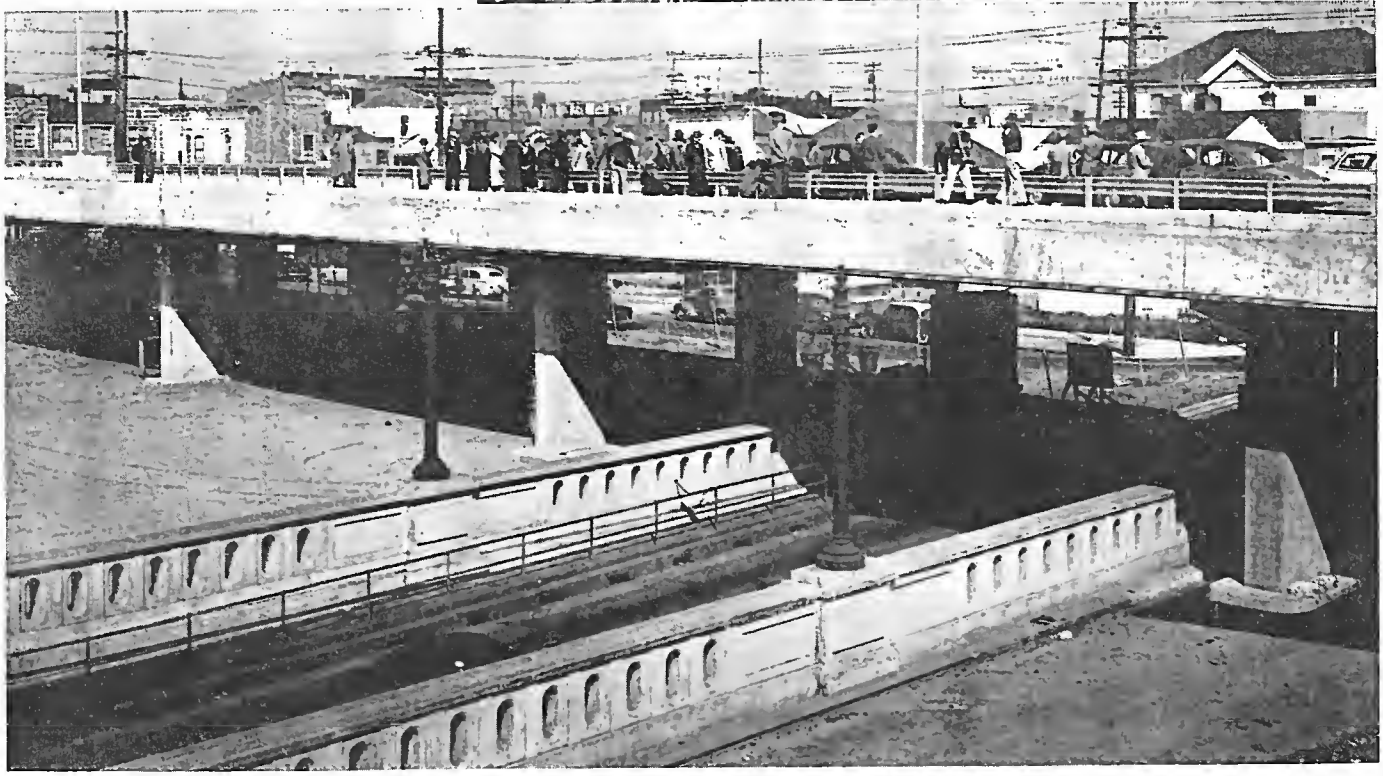
annual contributions are made by these parties with 50 percent of the amount coming from state highway funds. The contributions for the 1953-1954 Fiscal Year totaled $900,000.

ALTAMONT PASS

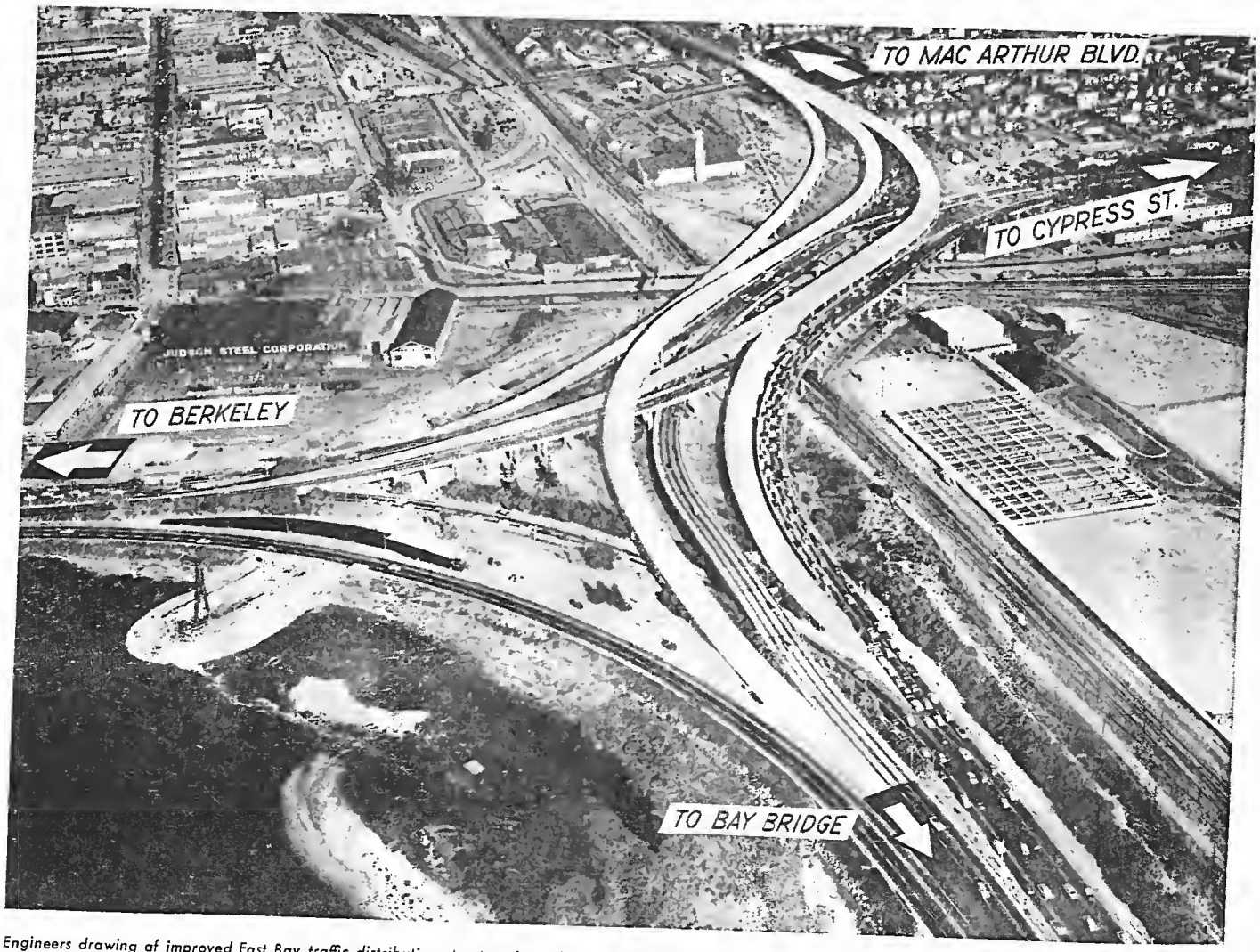
The Altamont Pass Freeway is a part of Route US 50, one of the two primary east-west routes originating in District IV. While the start of this route is on the San Francisco approach to the Bay Bridge, only the portion lying easterly of Hayward has been declared a freeway. However, the continuity of an east-west freeway facility from the Bay area to the Central Valley will be accomplished with a link from the Eastshore Freeway at San Lorenzo which will connect with this route near Castro Valley.

The development of this highway into a freeway may be considered to antedate the Freeway Law of 1939. A four-lane divided highway replacing the old Altamont Pass between Greenville and Mountain House was completed in 1938. It reflects the thinking of the time, the completed





UPPER—Eastshore Freeway in Oakland, looking north from vicinity of 29th Avenue. LOWER—Recently completed Posey Tube overhead.



Engineers drawing of improved East Bay traffic distributian structure in Oakland. A third-level ramp is being built aver existing traffic lanes cannecting the San Francisca-Oakland Bay Bridge with MacArthur Baulevard. A curved ramp will be added fram MacArthur Baulevard to the Eastshare Freeway. The impravements will double traffic capacity and are designed ta eliminate cross-weaving traffic.

job carrying many features of present freeway design.

The second section, 5.8 miles from the foot of Altamont Pass to 1.5 miles west of Livermore, was completed in September, 1950. In addition to increasing the carrying capacity of the outmoded two-lane road, this four-lane section incorporates controlled access with frontage roads, and provides a channelized connection with State Route 108 from Livermore.

CASTRO VALLEY BY-PASS

Continuing westerly, a 5.9-mile section to Hopyard Road was completed in the summer of 1951, and another from Hopyard Road to 2.5 miles west of Dublin was opened in November, 1953.

Currently under construction and scheduled for completion in September, 1954, is the 2.1-mile Castro Valley Bypass from Crow Canyon to a point near the present Foothill Boulevard. From this point construction will soon start on the 2.6-mile connecting link to the Eastshore Freeway. Work is also in progress on the most easterly 1.7-mile section in Alameda County, which is included in a District X project terminating in Tracy.

Thus with the exception of a 5.3-mile section now in the design stage extending easterly from Crow Canyon Road toward Dublin, we have a virtually completed Freeway and Expressway from Oakland to the San Joaquin County line. Typical of the rise in traffic volume on Route US 50 through the long Livermore Valley section is the daily traffic count at Greenville; in 1939, 12,000 vehicles, and in 1953, 21,000 vehicles.

The total length of the Altamont Pass Freeway is 33.9 miles, and to date $17,700,000 has been spent or obligated for this facility.

PACHECO PASS

The Pacheco Pass Road, signed as Route 152, is the only connecting link between the Santa Clara and the San Joaquin Valleys. Now heavily traveled, it developed from a toll road, and later as a transcontinental stage road, into a vital artery of transport particularly with respect to industrial service.

Replacing the alignment of convenience as it took shape through the years, a 3.25-mile section of controlled access freeway from Cape Horn to the Merced County Line was completed in December, 1950. Sustained alignment and grade on either side of the summit, compatible with heavy vehicle travel, have replaced the former sharp curves and gradients as steep as 7 percent.

A two-mile unit extending westerly from Cape Horn which was previously constructed is included in the section covered by freeway resolution. The cost of improving the 5.7 miles leading to the summit of Pacheco Pass totaled $1,300,000.

US 101-EL CAMINO REAL

Two sections of freeway forming part of the Coast Route, US 101, in Santa Clara County, the San Jose Bypass and the Gilroy to Sargent project, were completed early in the postwar program.

UPPER—Eastshore Freeway near San Lorenzo; Washington Avenue interchange in foreground, looking north toward San Leondro and Oakland. LOWER—Southern terminus of Eastshore Freeway, showing connection to Bayshore Highway.

The two sections are considerable distance apart, funds then available limiting construction to the most critical areas.

Prior to the opening of the eight-mile bypass in June, 1947, all traffic in the Coast Highway passed through the heart of the San Jose business district. Here traffic from the Eastshore and Bayshore Highways merged on its way south, and likewise traffic from the south dispersed on its way northerly to San Francisco or Oakland.

Midcity congestion forced the building of a controlled access freeway immediately easterly from central San Jose. Continuing the Bayshore Extension which skirts the city, the freeway starts at the Santa Clara Street underpass, meeting the old Monterey Highway at Ford Road, eight miles southerly from San Jose.

It is interesting to note that upon its opening, traffic split evenly at Ford Road, one half using the old road into San Jose and one half using the by-

pass. On the succeeding years as the through traffic volume increased, substantial gains have been made on the new leg, thus sparing the city street from traffic in no manner connected with San Jose.

The Gilroy section, a 5.7-mile controlled access highway from Gilroy to a point 0.5 miles north of the San Benito County Line, was completed in February, 1951. This four-lane section was constructed in two units, partly as a widening of the Coast Highway, locally known as Monterey Road, and partly a new alignment. It forms an additional link in the ultimate El Camino Real Freeway presently signed as US 101.

The 14.4 miles which have been completed include all of the mileage which has been declared a freeway to date. The cost of developing these portions as a divided four-lane expressway was $4,100,000.

WATSONVILLE—SANTA CRUZ

As early as 1936 the Division of Highways began studies to determine the best means of providing adequate facilities for the growing volume of traffic between Watsonville and Santa Cruz. The first step in the development of a new route was the completion in 1942 of a three-lane highway, with four-lane transitions where needed, between Watsonville and Rob Roy. While no extensive provisions were made for the purchase of access rights, moderate success in controlled access was maintained with the help of the adjacent hilly terrain and persuasion against indiscriminate entrance. In consequence the facility provided a reasonable facsimile of freeway features.

The growth of Santa Cruz farming, industrial and resort area soon provided a demand for an extension of the improvement to include the Rob Roy-Santa Cruz section, and resulted in the completion of a controlled access freeway in November, 1949. The cost of this project, 7.7 miles in length, was $3,769,000 including construction and right of way, or $490,000 per mile, reflecting the effect of eight major structures required for railroad and vehicular crossings.

Construction on US 50 in Castro Valley; Castro Valley Boulevard, the existing highway route, is shown to the right of the direct alignment of the freeway bypass

LOS GATOS-SANTA CRUZ

The highway between San Jose and Santa Cruz, in addition to serving the agricultural area through which it travels, has been subject to sizable surges in its traffic pattern due to tourist and vacation traffic utilizing the extensive resort area. The route has undergone extensive stage development and is now entering a transition to controlled access freeway.

The route in its entirety has not yet been adopted as a freeway. Precipitated by the building of the Lexington Dam, a 1.8-mile section of freeway has been completed at a cost of $1,500,000 at a location south of Los Gatos which bypasses the dam site. Scheduled for advertising in the summer of 1954 is the Los Gatos Bypass which connects with the Lexington section and includes an interchange dividing Saratoga traffic and that en route to San Jose. The amount of $2,263,000 is included in the 1954-1955 budget for the construction of this project.

In the design stage as declared freeway with route adoption approved are the Los Gatos-San Jose section and the Scott Valley-Santa Cruz section.

SKYLINE BOULEVARD

The use of Skyline Boulevard as an entrance to San Francisco has grown with the development of the peninsula residential areas. Heavy grades and

short radius curves have seriously reduced the utility of the road.

Currently under construction and scheduled for completion in September is a 2.3-mile section of freeway from Edgemar Road to Alemany Boulevard. This $1,000,000 project will facilitate funneling traffic into San Francisco dispersal routes. A connection from Skyline to the Coast Highway at Edgemar has been declared a freeway and is presently under design. This unit will provide a bypass for the Thornton Bluffs section on the coast alignment which is subject to severe punishment by the elements and from movement on the San Andreas fault which traverses this area. To the north, two additional units are scheduled for construction this year which will extend this facility to Lake Merced Boulevard in San Francisco. The amount budgeted for the 1.7 miles included in these two units is $1,092,000.

EMBARCADERO FREEWAY

Funds in the amount of $5,000,000 have been budgeted for the initial construction of the Embarcadero Freeway. The creation of this facility is an outstanding milestone in the development of transportation within the City of San Francisco. Crossing Market Street at the Ferry Building, it is the first freeway outlet offered to centers of employment, largely concentrated north of Market Street, connecting with the Bay Bridge and the peninsula.

Originating in the structure which connects the Bayshore Freeway with the Bay Bridge, the freeway proceeds generally parallel to Folsom Street, curving into the Embarcadero at Howard Street. Entirely an elevated structure in order to clear the approaches to piers and sheds, the planned units will run to Broadway, where ramps will come to grade at Sansome Street.

An eight-lane divided highway, the division is in a vertical plane rather than a horizontal. The lower deck will carry eastbound traffic toward the Embarcadero and thence northerly along the waterfront, while the

Trimble Road interchange on Eastshare Freeway. New Ford plant at Milpitas is visible to left of upper center.

upper deck will carry traffic in the opposite direction. This unusual construction, first of its type in the State, is, of course, predicated on space limitations.

Acquisition of right of way for the first one-mile unit is nearing completion at a cost in excess of $5,000,000.

PARK-PRESIDIO FREEWAY

The Park-Presidio Highway was built to provide an alternate route to the Golden Gate Bridge as well as to furnish a circumferential bypass from the western section of San Francisco and the Marina. While the planning of this facility predated the Freeway Law of 1939, when the 1.1-mile unit from Lake Street to the Golden Gate Bridge Approach was completed in 1940, it contained most of the essential features of a controlled access freeway, and provided an example for the people of the Bay area of what was to come in highway development. Built at a cost of $1,200,000 this four-lane facility has served well until recent congestion has made it necessary to commence planning for increasing its capacity.

Present studies include the improvement of all of the two-mile section

Davis Street interchange an Eastshore Freeway in San Leandro

STATUS OF DISTRICT IV FREEWAY PROJECTS

March 1, 1954

	Total miles	Completed projects		Under contract		Right-of-way costs
		Miles	Construction costs	Miles	Construction costs	
Bayshore Freeway; Bay Bridge to San Jose	48.8	14.4	$19,030,000	9.4	$18,259,000	$28,534,000
Eastshore Freeway; Richmond to San Jose	55.7	14.7	19,672,000	15.4	20,375,000	18,925,000
U. S. 101—Golden Gate Bridge to Santa Rosa	51.1	26.0	5,298,000	4.4	7,066,000	4,085,000
Black Point Cutoff; Ignacio to Sears Point	7.3	0.7	1,004,000			222,000
Napa area; Solano County Line to Union Station	22.4	14.6	1,441,000			712,000
U. S. 40—Richmond to Carquinez Bridge	13.8			0.1	388,000	3,500,000
Arnold Industrial Freeway; Hercules to Bridgehead Ave.	53.2	13.8	4,400,000			1,358,000
Oakland to Arnold Industrial Freeway near Ohmer	19.4	2.3	226,000	1.2	1,570,000	2,700,000
Mountain Boulevard; Tunnel Freeway near Lake Temescal to San Leandro	9.3	1.1	1,297,000			540,000
Altamont Pass; San Lorenzo to San Joaquin County Line	33.9	22.6	4,720,000	3.8	2,374,000	6,263,000
Pacheco Pass; 1 Mi. east of Bell's Station to Merced County Line	5.3	5.3	1,285,000			20,000
El Camino Real Freeway; San Jose to San Benito County Line, portions	14.4	14.4	2,856,000			1,269,000
Watsonville-Santa Cruz; Santa Cruz to Watsonville	15.3	7.7	2,740,000			1,029,000
Los Gatos-Santa Cruz; San Jose to Santa Cruz	21.1	1.8	1,337,000			1,827,000
Skyline Boulevard; San Francisco County Line to Edgemar Road	3.4			2.2	640,000	593,000
Embarcadero Freeway; Bay Bridge to Broadway	1.5					5,450,000
Park-Presidio Freeway; Golden Gate Bridge to Fulton Street	2.0	1.1	1,172,000			50,000
Totals	377.9	140.5	$67,018,000	36.5	$50,672,000	$77,077,000

covered by freeway resolution from Fulton Street to the Marina approach to the Golden Gate Bridge.

CONCLUSION

In discussing the development of the various routes we have used the word freeway in a very general sense. Technically there are but two full freeways presently in the process of construction, the Bayshore and the Eastshore, these routes sustaining no crossings at grade.

Except for isolated sections built through expedience to the technical requirements of freeways, the remaining routes are expressways, built to freeway standards with the exception of permitted crossings at grade. They are so designed as to be converted to the higher standard when funds are available and where traffic warrants. However, the impact of the tremendous growth of the Bay region on highway transportation has made it necessary to plan initial construction as full freeways for nearly all of the projects in the metropolitan area which are now in the design stage.

Without going into details of an accident - per - million - vehicle - miles comparison, a recent survey showed a rate of 2.14 for full freeways and 3.41 for expressway types of construction. Since approximately 70 percent of all accidents occur at intersections it is evident that the true freeway with intersections at grade eliminated is the goal toward which we point. Since the tremendous cost of the full freeways restricts complete application of their desirable principles, we have of necessity limited them to the most critical areas. As funds become available and as the need becomes more pressing, our present expressways will undoubtedly enter a stage development toward full freeways.

Aerial phata af $1,500,000 freeway project at Orinda Crossraads, looking taward Lafayette, showing pragress made to eliminate congestian. Paint 1 marks wider Pine Grave turn far Lafayette-to-Orinda traffic. Paint 2 shows part af underpass structure and side af Orinda Village-to-Maraga route under the highway. Paint 3 marks widening of State Sign Raute 24 ta six lanes. Paint 4 is site af cloverleaf ramp rauting traffic fram Orinda Village into Lafayette lanes.

HAZARDS ON STRAIGHT ROADS

The mere fact that a motorist is driving on a straight road is no surety against accident. The California State Automobile Association points out that 77 percent of all accidents occur on straight roads. Driving is a full-time job and anyone operating a motor vehicle should remain alert at all times.

STABILIZING LANDSLIDES

During the 1952-53 Fiscal Year the Division of Highways installed more than 23,000 lineal feet of horizontal drains as stabilization treatment of landslides and slipouts where the highways were being seriously affected. Development and improvement of horizontal drilling equipment made it possible to drill in areas considered impossible before.

Repair and painting of bridges and structures on the State Highway System cost a total of $592,849 during the 1952-53 Fiscal Year.

The Division of Highways spent $78,000 to control noxious weeds along the State's highways during the 1952-53 Fiscal Year.